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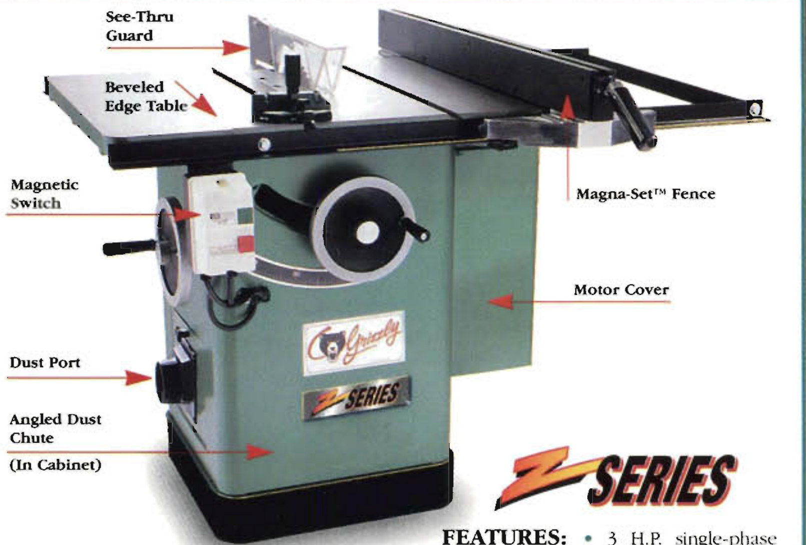

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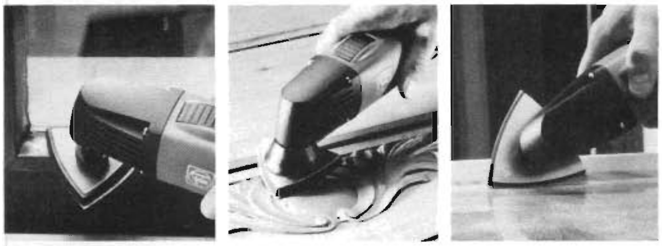

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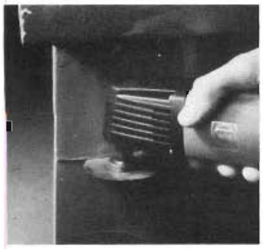

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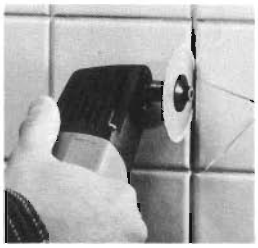

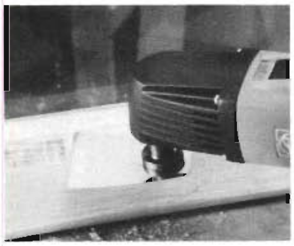

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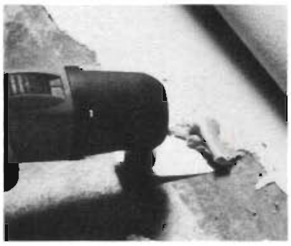

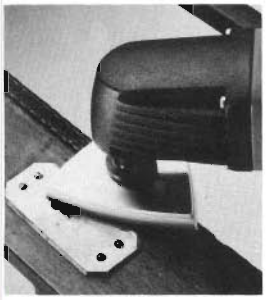

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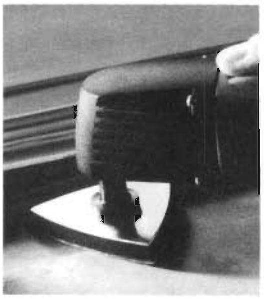

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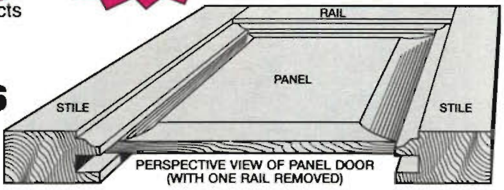

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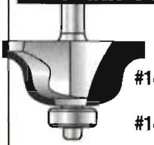

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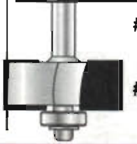

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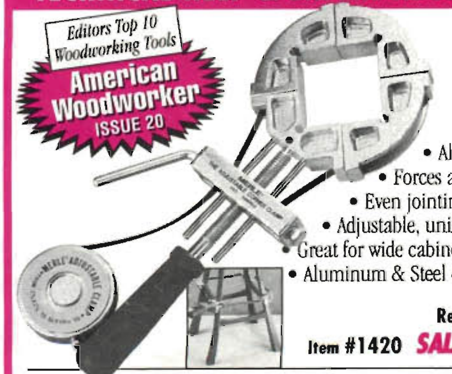

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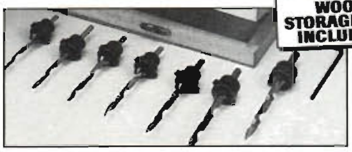

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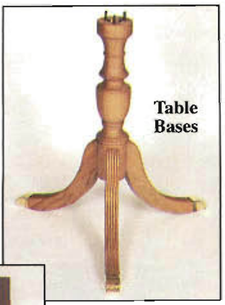

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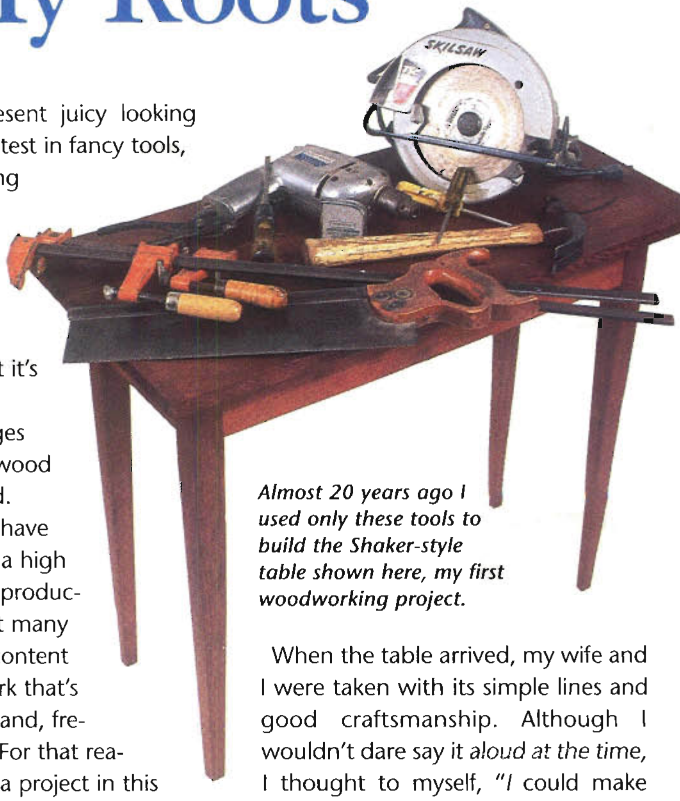
Returning to My Roots



Almost 20 years ago I used only these tools to build the Shaker-style table shown here, my first woodworking project.

In our zeal to present juicy looking projects and the latest in fancy tools, I fear we woodworking editors sometimes loose sight of what many of our readers really want from their magazines. We forget, perhaps, what it's like out there in the basements and garages where the weekend wood wars are really waged.

Sure, some of you have taken your hobby to a high level of craft and are producing fine furniture. But many of you are perfectly content to produce good work that's honest and practical and, frequently, just for fun. For that reason, I've undertaken a project in this issue that will launch a series of future projects called "The Little Shop That Could." I'll be working with bare bones equipment and everyday materials using my head instead of more and better equipment. In short, this concept starts with a scant $500 worth of tools, and its bench, jigs, cabinets and projects will grow from those humble beginnings.

I'm really looking forward to working in this manner because it takes me back to my own humble beginnings with wood. When I built my first project, my knowledge of the craft was as limited as my collection of tools. Heck, I didn't even take shop in junior high (the school was too small) or high school (didn't bother). No, I happened to stumble into woodworking because it looked like something I could do for fun.

My budding interest in woodworking came shortly after my wife and I bought our first house (a fixer-upper, of course). With the little money left from the down-payment, we mail ordered a Harvest Table from Thos. Moser Cabinetmakers for our dining room.

When the table arrived, my wife and I were taken with its simple lines and good craftsmanship. Although I wouldn't dare say it aloud at the time, I thought to myself, "*I* could make *that*." Not long after, I stumbled on a book by our tablemaker called *How to Build Shaker Furniture*. You may have seen it since it's still widely distributed.

I decided to try making the side table in the book, leaving out the drawer. The tools I had on hand got me through, with a couple exceptions. My toolbox (well, actually a shoebox) included a hammer, a couple screwdrivers, pliers, an assortment of drill bits, a tape measure and a ¼" chisel. I also had a handsaw and an electric drill which I'd traded for several books of "Top Value" stamps years before. My main power tool was a Skil circular saw which I had never used.

Before starting my project (or should I say adventure) in earnest, I practiced making a couple of mortise and tenon joints with my chisel. After some "fine tuning" I was able to hammer the joint together. It wasn't pretty, but it was strong and I felt good.

I made a second practice mortise, this time using my drill to remove most of the wood first. This mortise took a fraction of the time and I already felt my woodworking had made a technological leap. I cut the next tenon, and it was a little better, so I decided to work on my "good wood," some vertical grade fir I picked up from a local lumberyard.

Moser's book showed something called a jig to cut tapers on the legs using a table saw. I first thought a jig was either an Irish dance (hey, my name's Shanesy, remember) or a fishing lure. Since I did not have a table saw, I figured I'd learn about "jigs" later. I puzzled about how to taper those four legs for some time, and finally settled on simply cutting to a pencil line with my circular saw. It seemed a bit "hairy" to me. I got through all eight cuts, and though my nerves were showing some wear, my fingers were still connected to my hands and I felt another little victory in the "wood wars."

With my two new clamps, I edge glued two pieces to make the top, and was in disbelief over the strength of what resulted. I reckoned there must have been some mysterious and powerful forces at work in my garage.

After attaching the top, I was grateful for the generous overhang I had planned because, on final inspection, it did a good job of hiding imperfect joints.

After some more sanding and ragging on hot linseed oil, my first project was complete. It was a good day for me and, although I didn't know it at the time, I had taken my first step down a long road from which I've never turned back.

It's the fond recollection of that crossroads which largely inspired my desire to build "The Little Shop That Could." In future issues, I'll present projects built using this modest selection of equipment, sharing with you dozens of tips and techniques which aim to help you enjoy good woodworking in a shop environment that may resemble yours — short on materials and equipment, but long on ingenuity and enjoyment. PW

Stephen Shanesy

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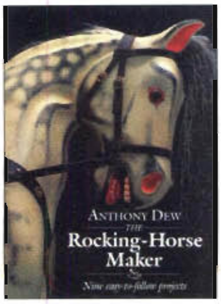

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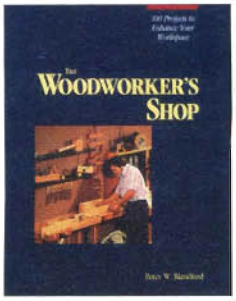

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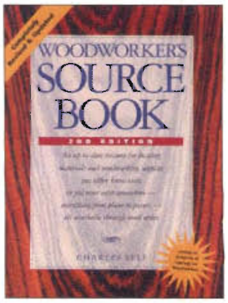

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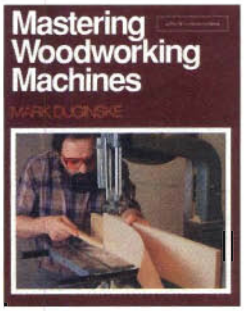

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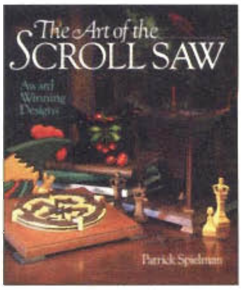

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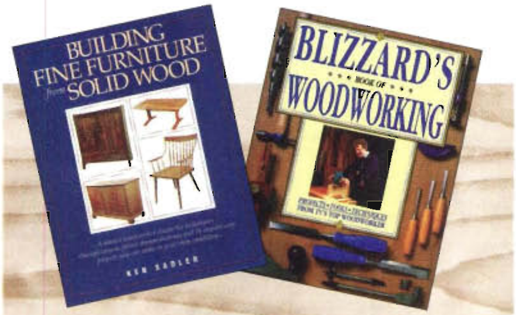
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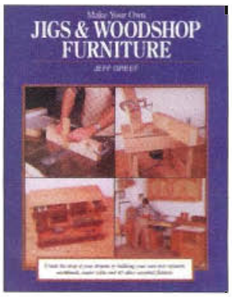

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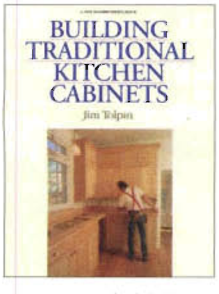

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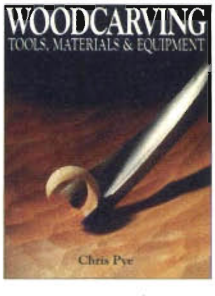

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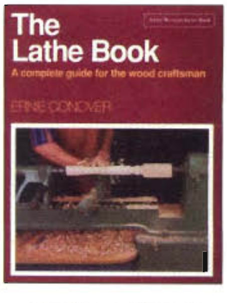

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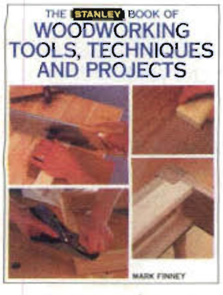
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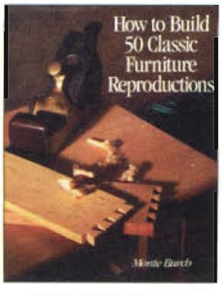

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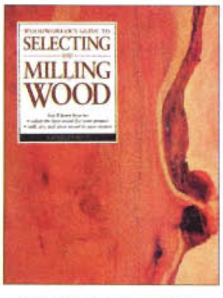

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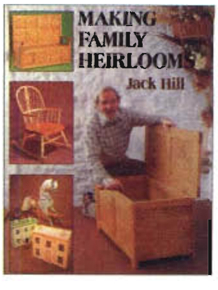

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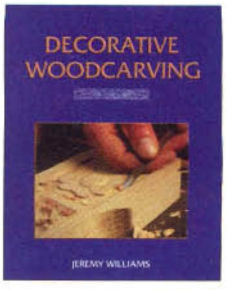

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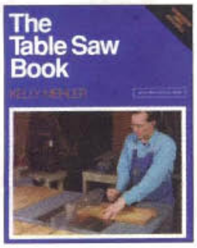
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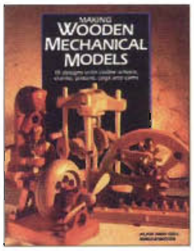
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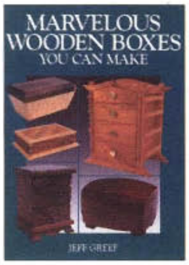
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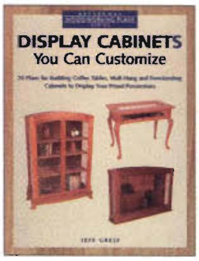
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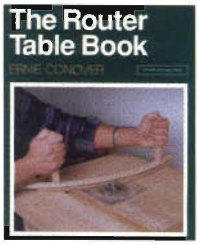
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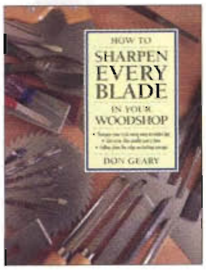
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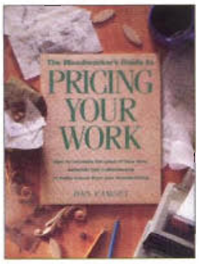
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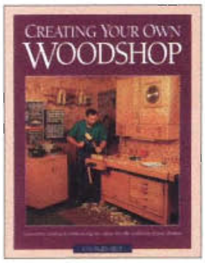
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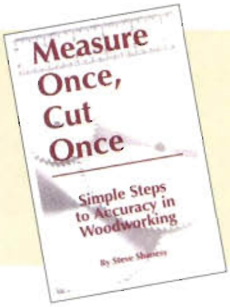

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INFEED/OUTFEED

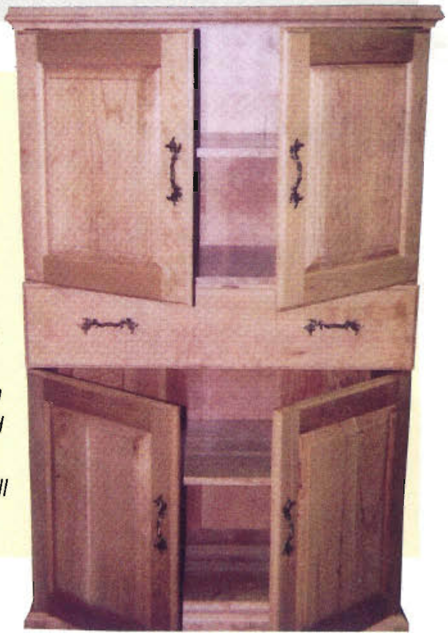
We welcome your comments and questions, pro or con, about the magazine or anything related to woodworking. We'd also like to see color pictures of what you're building. Send your input to: Infeed/Outfeed, *Popular Woodworking,* 1507 Dana Ave., Cincinnati, OH 45207. You also can e-mail us at Wudworker@AOL.COM or on CompuServe at Bruce Woods, 75463,3377. Letters may be edited for publication.

"Cherry" Pride

My daughter asked me to build a cabinet for her room, and drew a picture of the type she wanted. After six months of hard work on weekends, I ended up with this cabinet. I've been working with wood for about four years now, and have built a lot of things, but this cabinet I'm really proud of. I call it "Cherry."

George Yukich
Hiram, OH

Nice job, George. I bet your daughter will "cherish" it forever! — ***Steve***



Any Port in a Storm

I read with great interest Hugh Foster's article about Calvin Greer's wooden drums in your May 1995 issue. Since I've also been intrigued by these instruments, the article was very timely. However, I do have a question about its construction.

Hugh mentioned that if wood with natural defects are used, they act as natural ports and render the bottom port unnecessary. Nowhere else in the article is this "bottom port" mentioned. I'd like to make a nicely finished piece, which leads me to believe that I must have a port on the bottom. Is this on the bottom piece itself or along the bottom edge on one of the sides or ends? Also, how big should the port be, should it simply be a round hole, and does it matter where on the bottom that the port is placed?

Tom Gawrych
Kentwood, Michigan

The bottom port, while not discussed in the article, is shown in the diagram on page 57. It's simply a round hole in the bottom. I made a drum like this and placed a 2½" hole in one end. That worked well, too. — ***Steve***

Woodworking on the Road

I'm an over-the-road truck driver. Two years ago, I started wood carving, even on the road, to help relieve the stress of driving. Are you going to have any articles on simple projects with minimal tools? These big rigs have room, but not that much.

Also, what is there in the line of small, portable tools?

Harlan P. Connell
Quincy, IL

You don't have to leave your hobby at home. Have you considered the new cordless, battery powered multi-tool by Dremel, or a similar product from Ryobi? Here are some other ideas. Find or make a miniature lathe and build scale model Windsor chairs, try your hand at veneer inlay, or make dollhouse furniture with balsa wood and a razor knife. You could even make a few bucks by selling your handiwork! Just do us all a favor, Harlan, keep your eye on the road and not on your project while you're rollin' along in that 18-wheeler. — ***Steve***

Wanted: Sticky Back Felt

I've made a jewelry armoire 18"-wide x 15"-deep x 40"-high and want to line the doors and drawers with a sticky back felt. It should be 12"-wide and at least 36"-long. I can't locate a dealer in Omaha, and several woodworking stores in other states also couldn't help. Can you help me get the name of a dealer who offers this felt?

Ernest J. May Sr.
Omaha, NE

Don't make this job so hard, Ernest. I suggest you just use white or yellow glue to adhere regular felt. You could also use spray adhesive on "off the shelf" felt. Here's a better idea, although you'll have to track it down — silvercloth. This special fabric will not only prevent jewelry from being scratched because it's soft, but will also help prevent silver from tarnishing. Apply it as you would the felt. Check with a local jeweler for a source of supply. —Steve

More on Drying Lumber

Your answer in the May '96 issue on drying lumber should've mentioned that handbooks on wood drying are available from the wood products industry associations and the Government Printing Office. Also, Howard's question on use of limb wood for lumber seemed to be left unanswered. Note that the wood structure in limbs is different from that in the trunk. Limbs contain "compression wood" due to limb growth under gravitational stress. This wood dries and machines differently from trunk wood. Except for specialized uses in ship building and ornamental work, this wood is generally unusable for making boards.

Bruce Bruder
Darlington, MD

The U.S. Government Printing Office offers the Dry Kiln Operator's Manual *(280 pages). For more information, write to the U.S. Government Bookstore, Federal Building, Room 207, 200 N. High St., Columbus, OH 43215. — Steve*

Aww, Shucks. . .

Keep up the good work. Your publication is well-balanced for all levels of woodworkers. Your articles are informative, authoritative and educational. Your tool reviews are superb.

Above all, your free information service is a real added value. Also, your advertisers that I've dealt with deserve an A-1 rating.

Tom Rawley
Cambridge, Ontario

Popular Woodworking has improved considerably in recent times to where I consider it a good rival to *Fine Woodworking*. Your articles are more geared to the advanced and not so advanced non-professional...my category, and therefore a good alternative to other magazines.

Russell Smith
Birmingham, MI

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By Ron Bishop

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ATTENTION TRICKSTERS!

Tricks of the Trade shares readers' ideas for making woodworking tasks easier and safer. Send your original, unpublished ideas to Tricks of the Trade, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207.

If needed, please illustrate with a color photo or diagram. The best submission will win a Black & Decker VersaPak™ System, including a cordless 7.2-volt drill, a cordless detail sander and a cordless multi-purpose saw. The runners-up will receive $35 for each trick we publish.

The VersaPak System, introduced recently by Black & Decker, uses interchangeable batteries, which are sold separately to reduce tool prices.

In a Binder, Not a Bind

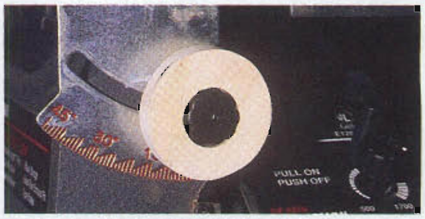
The woodworking magazines I read are full of neat projects, tech tips and other information that I find very useful. It would be nice to keep all of these magazines, but it's just not practical, and would be difficult to find the information later.

My solution is to cut the articles out and put them in plastic three-ring binder sleeves. I then insert them in a notebook divided into sections for toys, furniture, tech tips, suppliers, etc.

Norman Stewart
Tumwater, Washington

THIS MONTH'S WINNER

Get a Grip



I get a lot of good ideas from my fellow woodworkers through the "Tricks of the Trade," and I wanted to share my idea.

I recently bought a scroll saw and found it hard to tighten and loosen the adjusting knobs. Like a lot of senior woodworkers, I have arthritis in my hands and don't have a lot of strength in them. So I slipped plywood knobs over the existing knobs, and I find it a lot easier to loosen and tighten them. I also added a handle to the Allen wrench to tighten the blade.

Harold Johnson
Gig Harbor, Washington

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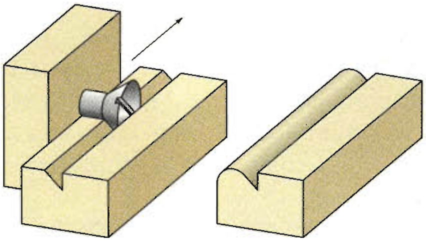
Low-tech Cock Beads



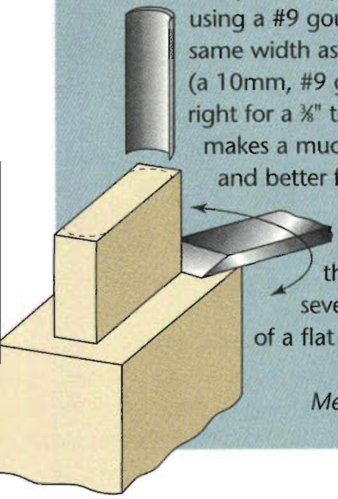
A small cock bead makes a neat finish to the edge of a board like a drawer front. But beading planes are things of the past and suitable router bits are expensive. I find I can do an acceptable job with a slot-head screw in a piece of scrap wood. I used a #10 gauge steel screw, but you can use a size to match the intended bead.

Drive the screw into the scrap wood so the head projects the width you want the bead. Turn the screw so one side of its slot acts like a little plane iron. This makes the groove and you can round the outer edge with an ordinary plane. Finish off with sandpaper.

Stanley Clark
Tampa, Florida

Gouge 'Em Out Instead of Chiseling

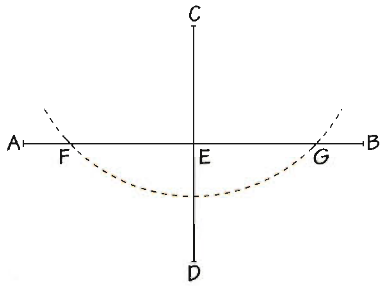
To neatly round off the corners of tenons to fit router cut mortises, I first undercut each corner by pressing a sharp chisel into the corner at the shoulder and sweeping in an arc. I then pare away the waste using a #9 gouge the same width as the tenon (a 10mm, #9 gouge is just right for a ⅜" tenon). This makes a much neater and better fitting tenon than trying to round the ends with several strokes of a flat chisel.



Dan Cassidy
Medway, Maine

Geometry for Squares, or Ovals

To construct an oval with given dimensions, draw lines AB and CD to the length and width of the intended oval. Draw lines AB and CD perpendicular to each other, intersecting at the center point of each other. This intersection is point E.



Draw an arc, whose radius is the length of AE, from point C that will intersect AB. Call these intersections point F and G. Drive a nail at points F, G and C, then stretch a string taut around all three nails and knot the string. Remove the nail at point C, insert a pencil in the loop and draw the oval.

Michael Burton
Ogden, Utah

Betty Crocker's Secret

While trying to figure out an inexpensive way to make table saw outfeed rollers, I was in a Goodwill store and found several wooden rolling pins. I bought them for next to nothing, took them home and cut the roller into 1" lengths on my band saw. I re-mounted the sections on appropriate size dowels (hole sizes vary with the rolling pin, although the outside circumference seems to be pretty standard), using short lengths of PVC pipe for spacers. I then mounted them in 1' x 4' boxes with the rollers extending above the top of the box, and bingo, I had an outfeed table complete with rollers. By mounting longer rolling pin lengths on U-shaped brackets and an adjustable stand, I made roller stands for my other tools.

One final hint: Make the first cut on the rolling pin in the center so that you can pull the handles out with as much of the center dowel intact as possible. These handles will come in handy for other projects.

Norman Stewart
Tumwater, Washington

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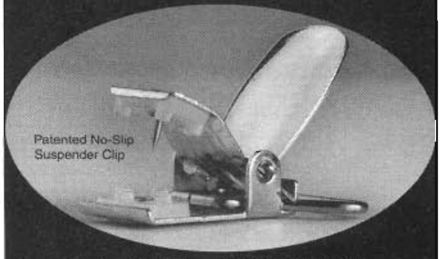

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DOVETALES

by Cristine Antolik

Whether you design and create your own projects, or help your spouse in the shop, this is your forum! If you have a woodworking question or concern, would like to share your project ideas, or are seeking advice on anything from tools to finishing, I'd love to hear from you! Drop a letter to Dovetales, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207 or you can send e-mail to us at Wudworker@aol.com.

FOUND! — TOOLS FOR WOMEN (WELL, ALMOST)

Last month, women woodworkers spoke out about how tools designed for the average male don't suit those with smaller builds because the grips, heights and weights can be awkward and uncomfortable. So we've asked a representative sampling of tool manufacturers — Sears Craftsman, DeWalt, Ryobi and Makita — what accommodations are being explored to help appeal to tool users of all sizes.

Tools have changed dramatically over the last few decades, and so has the typical woodworker. People from all ages, backgrounds and sizes are venturing into the craft. So it's becoming an increasing challenge to design tools that appeal to the vast majority — especially when a multiplying number of tool users are women. In fact, many manufacturers report that about half of their customers are female.

> **"There's no question that more and more women are empowered and feel empowered to do projects by themselves." — Andy Ginger, Sears Craftsman**

For many women (and men with smaller builds), it still may be difficult to find quality tools that are comfortable, but many manufacturers are taking steps to help make tools more size adaptable.

Sears has been a pioneer in targeting atypical tool users. When its stores sprung up in shopping malls during the 50s, it included women in its market base. By aiming to provide helpful, but not condescending, information, women ventured from the clothing and appliance sections into the tool department.

Sears' Craftsman brand also evolved to offer tools in many sizes, styles and configurations to fit as many customers as possible. And a few products have been developed specifically for women, such as a shape conforming back support to help lift heavy objects.

In the last few years, Sears has taken a more active approach to attract women. For example, *You Do It* magazine was recently published for female do-it-yourselfers. The publication's advertising differs from typical tool ads. Instead of showing what the *tool does*, it demonstrates what the *user* can do *with* the tool. This is because most women are results-oriented rather than process-oriented, says Andy Ginger, Craftsman's director of brand marketing. He adds, "What they're really more focused on is what I can do with this tool as opposed to a guy who may already own 12 saws and is in the process of acquiring a 13th saw, and maybe collects them because he's into the tool itself and the functions and accessories that go with it."

Targeting the female market has been profitable for Sears, Ginger says, "There's no question more and more women are empowered and feel empowered to do projects by themselves."

But Sears Craftsman is not a typical representative of the tool market. Other manufacturers haven't taken as strong an approach to serving smaller-sized tool users because they don't forsee the profitability. But many companies are working to increase the adaptability of existing tool lines.

DeWalt aims to make its products "comfortable for everyone" by testing new tools in as many different hands as possible, including from people of different sizes and ages, says Rory Leyden, DeWalt's product manager. "The attention that we pay to the end user in designing our product enables us to design a product that the end user feels like they've designed," he says.

Taming the Router

Since you are conducting a search for the best tools for women, you may be interested to know that I've developed and modified tools so they're especially handy for women (or for that matter, anyone with smaller hands or perhaps older hands that aren't as strong as they once were).

The router is the tool I've concentrated on because it's the most versatile tool in the shop. When I first got one, it scared me to death! Further, every time I took it off the shelf, gritted my teeth, plugged it in and attempted to use it, I screwed up whatever I was working on. I finally found someone teaching a class on routers. I paid my money and learned. Over the years, I also learned why I was screwing things up and why the thing scared me silly. The issue was control of the machine, so I've developed some aids to mitigate that problem.

For a SASE, I'd be happy to send your readers sketches of a couple of things they can do to gain the upper hand with their routers. Also, as a professional woodworker who works alone, I'd be thrilled to engage in some pen pal relationships with other woodworkers (men and women) around the country.

Carol J. Reed
610 Amigos Rd.
Ramona, CA 92065

Local Goldmines for Inexpensive Material

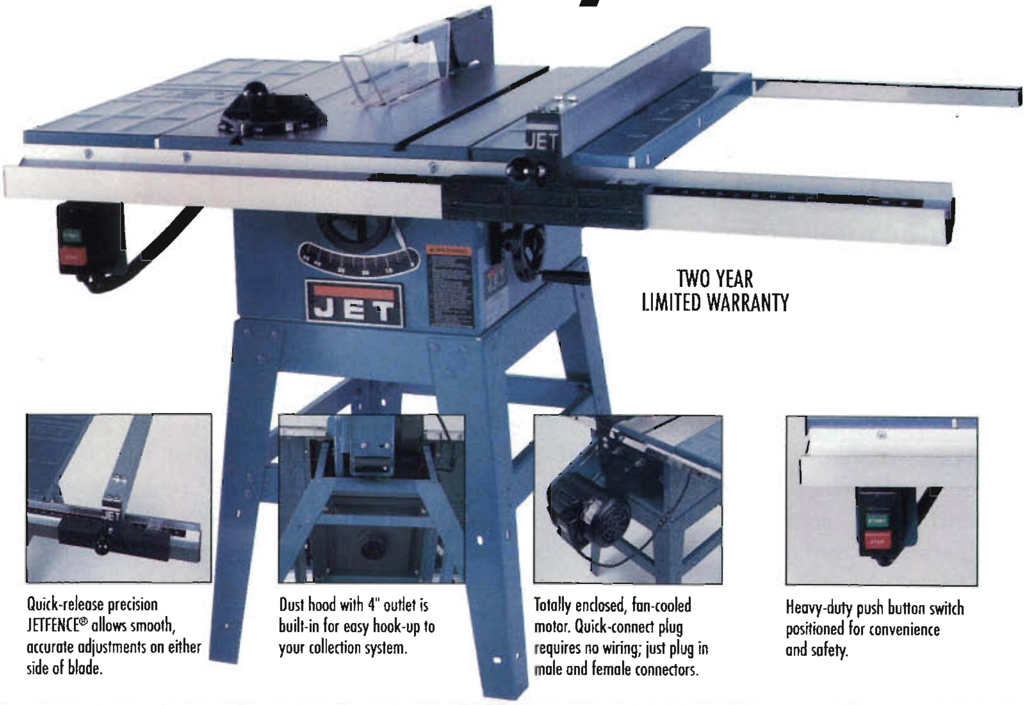
For those that do small stuff like scroll and band saw cutouts, custom cabinet shops can be a good source of material. In my shop, we will give scraps to people that come and get them, especially during the summer. I'm sure there are other shops that will either give away scrap or sell at a low cost. The types of wood and plywood vary, but often oak or other hardwoods are available.

Betty Bridges
BBrid38@aol.com

A tablesaw built with you in mind

During the two years we spent designing our totally **NEW** 10" tablesaw, we asked woodworkers like yourself what features they wanted in a saw.

This is what they told us.



Quick-release precision JETFENCE® allows smooth, accurate adjustments on either side of blade.

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May 95	Router bit basics; walnut buffet; sportsman's desk; carving luxury cars; finishing with wax; country farm table; authentic wooden drum.
Mar 95	Preparing stock; traveling lawn chair; flap-top table; T. Rex whirligig; cedar-lined hope chest; pier table.
Jan 95	Handkerchief table; toy chest; legless coffee table; corner computer desk; how to co-op your shop.
Nov 94	Carve a loon; library steps; a chest for silver flatware; carving sailor sam; using the tormek grinder.
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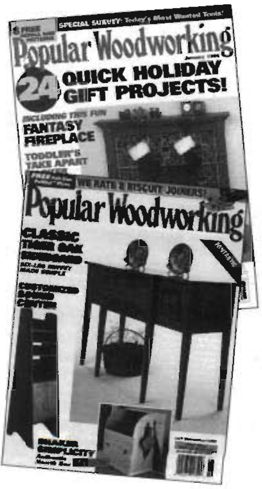
Mar 94	Sewing and knitting box; planer stand; carving in the blue whale; walking canes; table saw power feed; walnut quilt rack.
Jan 94	Doll cradle; carving King Lear; child's sleigh; lathe ornaments; beehive octagonal clocks; crayon battleship.



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PBAW

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Instead of offering alternate tool sizes to tailor to smaller users, Leyden says DeWalt continually works to make its products lighter in weight and more comfortable to hold for all tool users.

Ryobi bases its tool size on the average user, then tries to make accommodations to fit larger and smaller people. Alex Chunn, industrial design manager for Ryobi, says, "We do what we can not to limit the smaller hand size — a lot of it is dependent tool by tool." For example, detail-oriented tools are scaled down more than other tools.

As Asian-based international companies, Ryobi and Makita report that their design scales are based on a smaller average size than most North American-based manufacturers since Americans tend to have larger builds than Asians.

But setting up shop in the States has increased the original basis for determining that "average size." Charles Schaefer, Makita's product planner, says, "I think one of the things that gets forgotten is how big the average American male is. . .and in the construction trades they tend to attract bigger guys, so we gotta make it comfortable for him and his hand. (But) it's not just the bigger guys we design for, you've gotta hit that average."

He adds, "Our attitude is make (tools) for contractors and for someone who has to make his living with a tool, and then go from there. And that's what do-it-yourselfers wanted, and we're proud to sell it to him."

Schaefer says Makita's costs of offering the same tools with smaller grips would outweigh the profits. "We are very much aware that women use our tools, but we would never be so condescending as to paint one pink or to just say, 'Let's just do a little one for some little lady,'" he says.

The smaller, lighter tools that Makita does offer haven't sold as well as their larger counterparts because of the "Tim Allen" mentality — buyers want the most power or voltage available, Schaefer says. He advises, "Don't get caught up in 'more power' and 'bigger is better.' (The tool) doesn't have to be the biggest one out there, but really the best one for the job."

Makita's research has shown that typically the tool with the mid-grade power will do most of the work needed. For example, a 9.6-volt cordless drill will perform 95 percent of what people want it to do. Schaefer adds, "Yet, I want the 7.2 (volt). It's going to do about 90 percent of what I do at home. . .and it's a matter of what we call weight/performance ratios, and there's a tool that's real lightweight but real high performance. It's got high torque, the speed does everything you want, but it's nice and light. And for me, it's the perfect tool."

Manufacturers report that technology should continue to develop to help make tools lighter and more comfortable for all shapes and sizes of users. Until then, besides stepping down your power, remember that only *you* can truly tell what the best tools for your needs are. Patronize stores that will let you try tools out before you buy them, and seek the advice of other woodworkers. Also keep in mind that tools that have their weight distributed evenly are more comfortable to hold, such as a T-handle drill. And don't ever sacrifice quality — spending more upfront will pay off in the long run. And, finally, please continue to look to "Dovetales" for more tool advice (and feel free to share your own). PW

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Setting Up Shop

Help me please. I am considering woodworking as a hobby right now, but who knows what the future holds. I am interested in making all kinds of cabinets. I need to know, as a beginner, what equipment, tools and machinery I'll need to get started. Do I need to take a class in woodworking, or can I teach myself with the aid of magazines like this one? Thank you.

Shirley R. Thompson
Detroit, Michigan

The first part of your question is answered right in this issue. Check out Editor Steve Shanesy's "The Little Shop That Could" and Hugh Foster's "Setting Up Shop" to get a detailed look at what basic tools you'll need to fit your needs and budget. As for learning woodworking, publications are helpful and will keep you updated on evolving tools and techniques, but hands-on experience is also invaluable. Sign up for some introductory woodworking classes in your area. They will provide you with a solid base to start from and give you the opportunity to correct any flaws in your techniques. And if you'd like to specialize in cabinetry, you should continue to take more advanced classes on this subject. Welcome to the craft! — ***Cristine***

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Trees increase property values, and make our homes and neighborhoods more livable.

Trees provide food, shelter, and nesting sites for songbirds.

Trees help conserve energy. They cool our homes and entire cities in the summer, and slow cold winter winds. Shade trees and windbreaks can cut home utility bills 15-35%.

Trees clear the air we breathe. They provide life-giving oxygen while they remove particulates from the air and reduce atmospheric carbon dioxide.

Trees along rivers and streams help keep the water clean. Trees reduce the risk of flooding. Planted as field windbreaks, they fight topsoil erosion.

America needs more trees

The United States has lost a third of its forest cover in the last 200 years.

Our towns should have twice as many street trees as they have today.

We need more trees around our homes and throughout our communities. We need more trees to protect our farm fields and our rivers and streams. To provide wood for our homes and a thousand products we use every day.

10 Free Trees

The National Arbor Day Foundation, the world's largest tree-planting environmental organization, is sponsoring its Trees for America campaign to plant millions of trees.

Here's how you can participate. When you join the Arbor Day Foundation you will receive ten free Colorado blue spruces, or other conifers selected to grow in your area.

Colorado blue spruces have silver, blue-green color and compact conical shape. Spruces can be planted as a privacy screen, as an energy-saving windbreak, as individual ornamentals, or as living Christmas trees.

Your trees will be shipped postpaid at the right time for planting in your area, February through May in the spring or October through mid December in the fall. The six to twelve inch trees are guaranteed to grow, or they will be replaced free.

You will also receive The Tree Book with information about tree planting and care.

To become a member of the Foundation and receive your free trees, send a $10 contribution to Ten Blue Spruces, National Arbor Day Foundation, 100 Arbor Avenue, Nebraska City, NE 68410.

Join today, and plant your Trees for America!

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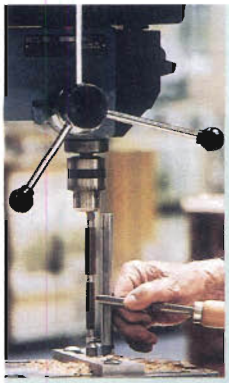
NEW PRODUCT RELEASES



One Good Turn...

The Verti-Lathe Attachment turns your drill press into a mini-lathe suitable for turning small spindles, furniture parts, pens and toys using standard turning tools.

This accessory offers a ball-bearing tailstock center and a sturdy 6" tool rest. It's also capable of producing turnings up to 12"-long and 2½" in diameter.

The attachment operates on any drill press at speeds between 750 rpm for roughing, 2000 rpm for shaping and 4000 rpm when finishing.

The Verti-Lathe is available through many mail order catalogs for $44.95. A long pen-making mandrel and spur center/screw chuck set are available as accessories.

For more information, write to Verti-Lathe, 306 Albany Ave., Kingston, NY 12401 *or circle #164 on the Resource Directory Coupon.*

"User Friendly" Dado

DML brand is now offering a "user friendly" dado for use on table and radial arm saws. The Thoroughbred™ cuts a flat bottom dado that can be adjusted, with a dial, from ¼" to slightly over 13/16" without removing the tool from the machine.

The three-piece unit employs two blades for cuts from ¼" to ½" and a third blade for larger cuts.

The Thoroughbred dado is available in many woodworking supply locations for about $220. For more information, write Primark Tool Group, DML Brand, 1350 South 15th Street, Louisville, KY 40210-1861; (502) 635-8100 *or circle #163 on the Resource Directory Coupon.*

No Talent Required

CMT Tools™ is making one of the world's most versatile tools even better. The company's new 3D Carver™ transforms your plunge router into a carving tool, requiring very little artistic talent.

The system uses a carbide-tipped V-groove bit enclosed in a 45-degree bushing. With the router plunge mechanism unlocked, the bushing follows the slots in any one of 46 templates used with the special bit. As the slots become wider, the router moves downward and the V-groove gets wider, and vice-versa.

The carving bit is available for $99.10, while the templates and holding frames are sold separately. To receive the CMT catalog or for more information, call (800) 531-5559 *or circle #160 on the Resource Directory Coupon.*

Don't Lose Your Head

Formerly available only in Europe, Craftsman is now introducing the Two-In-One Forstner Bit Set in the United States. The set incorporates an economical interchangeable bit head and shaft system.

The Forstner bits are high-speed steel, and the set includes ¾", ⅞", 1", 1¼" and 1⅜" heads with a ⅜"-diameter shaft and a storage box.

The set is available at Sears stores for about $40. For more information, *circle #165 on the Resource Directory Coupon.*

Rack and Pinion "Steering"

Delta International Machinery is now offering an improved benchtop band saw for the home woodworker.

The 8" model 28-185 replaces the 28-180 and adds a new rack and pinion Micro-Set® blade guide and guard system, allowing the blade guard to be adjusted precisely and safely.

Other standard features include the Quick-Set® Tensioning System for proper adjustment and setting of different width blades, a 1/5 hp motor, a miter gauge, independently adjustable blade guides, and a zero to 45-degree tilting aluminum table. The 28-185 retails for about $180. To locate a Delta dealer near you, call (800) 438-2486 *or circle #161 on the Resource Directory Coupon.*

Nothing Fuzzy With This Logic

S-B Power Tools is offering a model B2310K:10 12-volt T-handle cordless drill/driver with a 15-minute Fuzzy Logic charger.

The Fuzzy Logic charger fully powers batteries within 15 minutes without overcharging, thereby increasing battery life. The charger senses battery voltage, temperature and charge level, then selects the best possible charge current to fully and safely charge the battery.

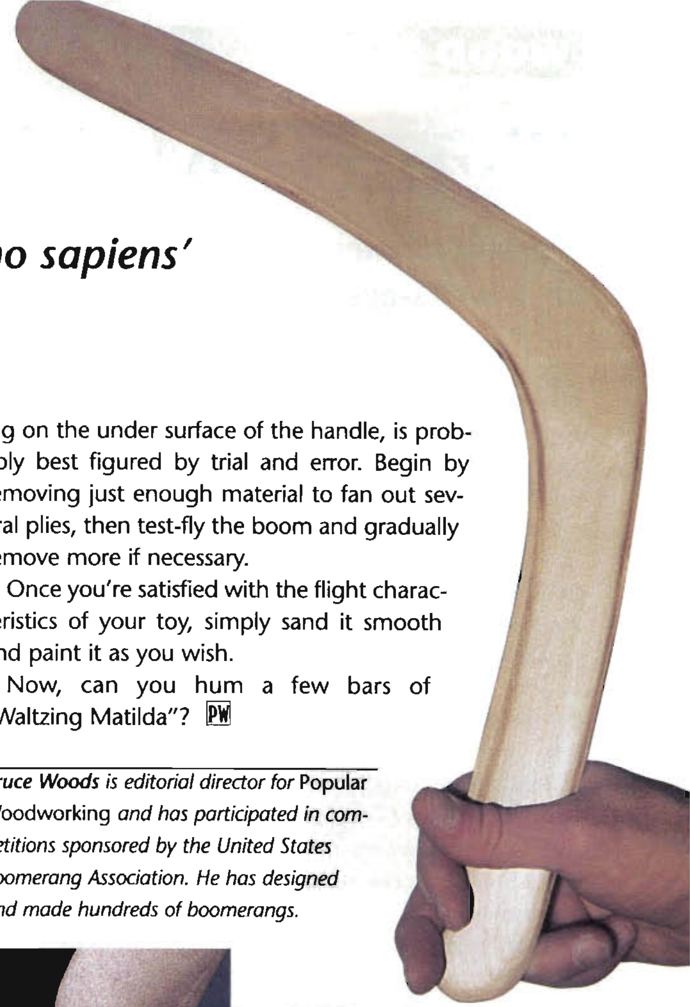
The B2310K:10 kit includes the ⅜" keyless chuck drill/driver with two batteries, charger and case for $210.

For more information on this drill/driver, contact S-B Power Tools Company, 4300 West Peterson Ave., Chicago, Illinois 60646; (312) 286-7330 *or circle #162 on the Resource Directory Coupon.*

The Boomerang Comes Back!

Because you asked for it, one of Homo sapiens' oldest toys returns to our pages.

By Bruce Woods



In our December, 1995 issue we featured an unusual boomerang shaped like a Christmas star. A number of you wrote to us saying you'd built that simple project, enjoyed it, and wanted to see plans for a more traditional boomerang. Your wish is our command.

Begin by obtaining some quality ¼" plywood. The boomerang pictured was made from 5-ply, ¼" Baltic birch. If you can find ¼" material with seven or more plies, do so; hobby shops are good places to check.

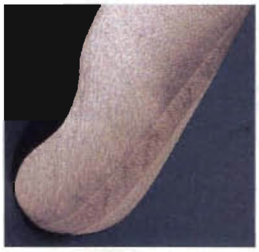
The design shown here represents a traditional Aussie-style 'rang. Before cutting it out, refer to the photos detailing the shaping of the airfoil. The shaped side will be the top of your 'boom. Transfer the pattern found in the PullOut™Plans onto the wood in such a way that any warping in the material will, with the boomerang placed flat on a table, cause the wing tips to curve upward rather than down.

A scroll saw is the tool of choice for shaping a boomerang. A saber saw or band saw can also be used. Once the basic shape is cut, mark the airfoils in pencil as shown. Form the leading edge by removing a wedge ⅛" thick and extending ¼" back from the edge as shown. The trailing edge will extend ½" into the upper surface of the boomerang. The wood can be removed with a rasp, by hand-sanding or with a power sander and 80-grit paper. The "undercut," an additional bit of sanding on the under surface of the handle, is probably best figured by trial and error. Begin by removing just enough material to fan out several plies, then test-fly the boom and gradually remove more if necessary.

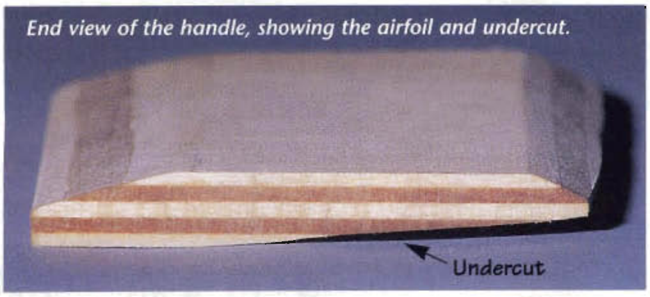
Once you're satisfied with the flight characteristics of your toy, simply sand it smooth and paint it as you wish.

Now, can you hum a few bars of "Waltzing Matilda"? PW

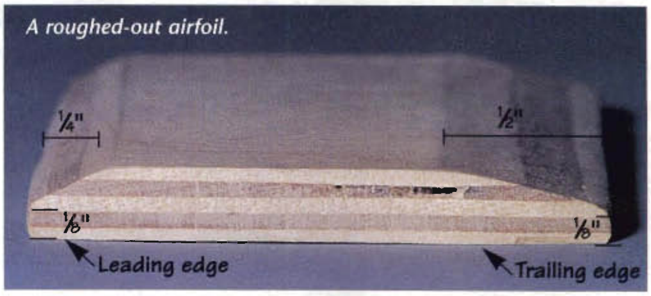
Bruce Woods is editorial director for Popular Woodworking *and has participated in competitions sponsored by the United States Boomerang Association. He has designed and made hundreds of boomerangs.*



The undercut can be seen in the fan of the plies.



End view of the handle, showing the airfoil and undercut.



A roughed-out airfoil.

IT'S FLYING TIME AGAIN

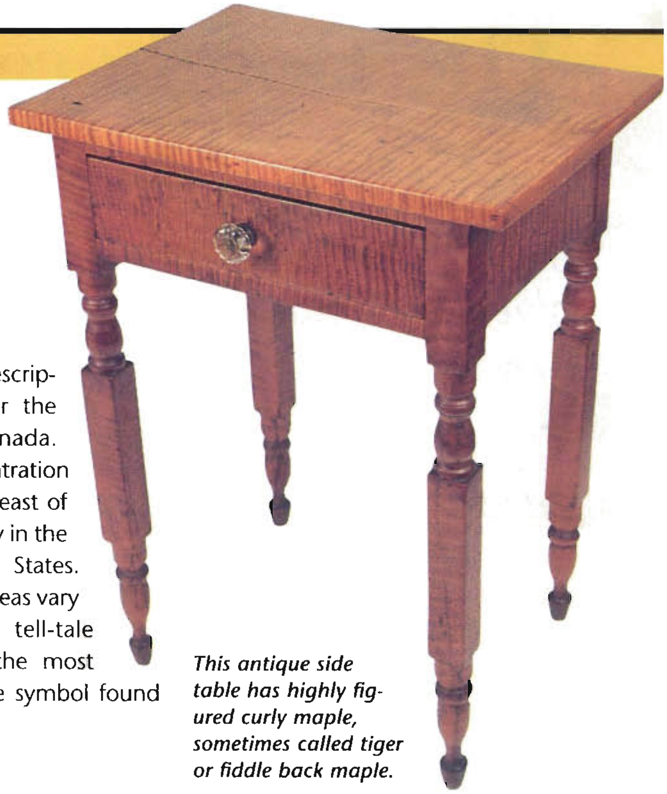
Pick a wide-open spot to test your boomerang. You want a light breeze; it's hard to get a full return on a still day, and winds of over five miles per hour will make it difficult to control the boomerang.

With the breeze blowing from 12 o'clock, face between one o'clock and three o'clock. Hold the boom' near vertical, with the shaped surface facing you, and lean it slightly away from your body. Both this lean and the angle at which you face into the wind should be experimented with to see which produce the best flights.

The throw should be just slightly upward, but primarily forward. Don't overdo the power; spin is far more important than speed. The motion is similar to that of cracking a whip. Your boomerang should spin out and gradually lean over as it curves into the face of the wind. Then it will ride the breeze back, spinning to the ground like a miniature helicopter. To tune it, remove more material from the undercut or hold the wood over steam and warp the tips of the wings upward slightly.

Figured Maple

A prized domestic hardwood, be it bird's-eye, curly or quilted.



This antique side table has highly figured curly maple, sometimes called tiger or fiddle back maple.

Few wood species are as prized for a wide variety of grain figures as maple. Curly, wavy, bird's-eye, fiddleback, quilted and tiger patterns are all found in the relatively expensive lumber milled from various maple trees.

General Description

"Figured maple" is, however, more a general woodworking term than a reference to a botanically specific tree. Most figured maple comes from sugar maple trees *(Acer saccharum)*, although some is available from red, silver, bigleaf and black maple trees *(A. rubrum, A. saccharinum, A. macrophyllum, A. nigrum)*. There are scores of local names for these woods, the most common of which refer to "hard" versus "soft" maple.

Maples of various descriptions are found all over the United States and Canada. But the greatest concentration of marketable maples is east of the Great Plains, primarily in the Lakes and Mid-Atlantic States. Tree sizes and growing areas vary greatly, although the tell-tale maple leaves are, for the most part, quite similar to the symbol found on the Canadian flag.

Availability

Figured maple is expensive, as domestic hardwoods go. There are tremendous seasonal and year-to-year fluctuations in price, often depending on the vagaries of consumer popularity and other factors. But normally, figured maple costs between $7 and $10 a board foot. The prominence of the figure will also affect price, with particularly striking effects pushing the cost to the high side.

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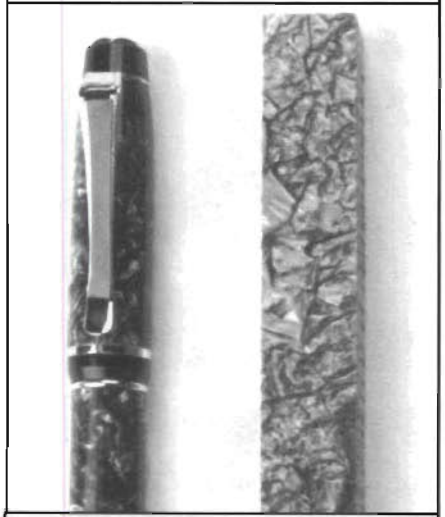

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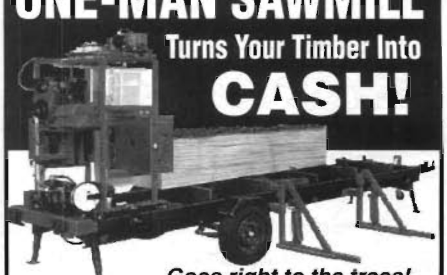

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These prices force many woodworkers to use figured maple in veneer form. This brings the cost down to about $1.25 to $2.50 per square foot. Veneers also eliminate the planing problems inherent in figured maple.

Working Properties

Figured maple is a challenge to work. The unpredictable grain means only the sharpest tools should be used. All machining is best done at the slowest feed speeds possible. This is particularly true of power planing. Take off no more than 1/32" per pass as you near the desired thickness. Even so, you will likely have to use a scraper to get a smooth surface. In hand planing, use only a very low angled blade (10 degrees or so), with a plane sole opening as narrow as possible.

Boring, cross-cutting and ripping are less problematic than routing or shaping. When routing and shaping, again be careful to feed slowly. When shaping, use a heavier cut first, followed by a lighter final pass for best results. As in power planing, the final pass should be limited to about 1/32".

Characteristics

Exactly how the maple tree's growth pattern produces the various figured effects is unclear. For bird's-eye maple, some wood scientists lean toward a virus as the culprit. For curly and quilted maple, some insist localized weather patterns are responsible. Other theories abound. To date, though, no one has a definitive answer to Nature's handsome riddle of the maples.

Figured maple is usually a whitish color with a slight reddish or brown tinge. Occasionally, some maple lumber is red or even dark red-brown, but this is rare for figured maple. Maple is strong, stiff and has a fine uniform texture. The wood does shrink and swell a lot during humidity changes.

Figured maple is usually culled out from straight-grained maple lumber and reserved for fine woodworking projects like musical instrument backs, furniture, fancy turnings and gunstocks.

Finishing

Figured maple is an excellent candidate for dyes and stains, with a clear finish over the coloring. These coloring processes highlight the various figures and impart a greater sense of depth. But experimentation on scrap pieces is absolutely necessary. Sometimes the actual effect is not always what was intended.

When figured maple's pros are weighed against its cons, the wood is still well worth using. It rarely fails to draw compliments. PW

Ken Textor, a contributing editor for Popular Woodworking, *lives in Arrowsic, Maine. He got his start in woodworking as a boat builder.*

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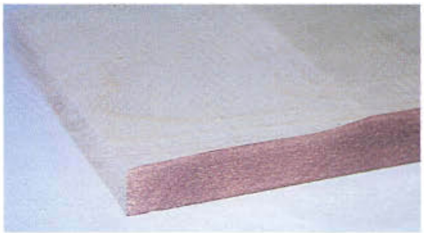
SNIPE SOLUTION

I'm in the process of purchasing my first surface planer, and I've been warned about snipe. What is it, how does it happen, and can my choice of planer help me avoid this problem?

Rudy Albachten
Austin, Texas



An extreme example of snipe, which can be prevented with proper machine setup, stock preparation and support during planing.

A snipe is a mark which appears on planed boards, and is characterized as a sudden change in the thickness of the board. Snipe marks are usually located at the ends, and are noticeable when the difference in thickness is as little as .003". Because snipe marks become even more obvious when wood is finished, they must be avoided, or you would be forced to lop 3" to 5" off both ends of your planed wood — but this is an expensive and impractical remedy.

To avoid the time and expense of excessive sanding or trimming, it's best to eliminate the snipe at its source — your planer, your work methods or a combination of both.

First, let's examine your work methods. Unless you're planing boards that have been face jointed, making them flat on one side, you won't be able to achieve snipe-free planed surfaces. One indication that you're planing warped boards is when the snipe mark is tapered. In this case the mark is wider on one edge of the planed surface and tapers to a narrower width at the other edge of the board.

If you have a jointer and produce nice, flat surfaces ready for achieving their final thickness and you still have sniping, here are some ways to eliminate, or at least minimize, snipe marks.

You probably noticed that the snipe marks are usually the same distance from the ends of the boards, no matter how wide the board. This gives a hint about the cause. The distance the mark is from the leading edge of the board will be equal to the distance between the cutterhead's lowest point and the center of the outfeed rollers (see ***diagram***). The distance the mark is from the trailing edge of the board is the same as the distance from the infeed rollers to the cutterhead's lowest point.

The snipe is usually caused when the bed rollers are above the table surface. As the leading edge of the board encounters the raised outfeed bed roller, the board rises, causing the cutterhead to cut deeper. As the board's trailing edge leaves the infeed bed roller, it drops down to table level, causing the characteristic snipe at the end of the board. Remedy: When finish planing, be sure to adjust your bed rollers to be no more than .002" to .003" above the table surface.

Another cause of sniping, although rare, is the powered (upper) infeed roller. On some planers, the powered infeed roller has straight, rather than spiral, serrations along its length. If the trailing end

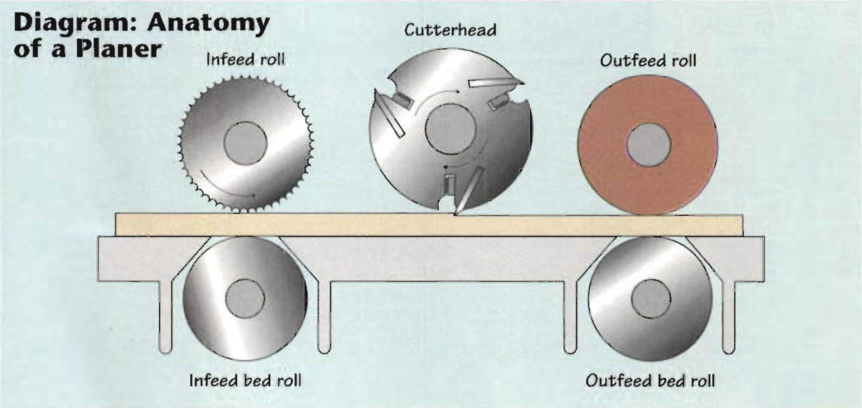


Diagram: Anatomy of a Planer

by Louis C. Brickner Jr.

of the board happens to line up with the sharp edge of the roller serration, the roller will lift up the end of the board just as it exits the feed roller, causing a snipe mark. To check for this condition, plane a few boards that have been mitered 30 to 40 degrees on the trailing end. If the snipe goes away, your straight serrated infeed roller is probably the culprit.

Unsupported long or heavy stock may also cause sniping. If you're planing such stock unsupported at both ends, the weight will tip the ends of the board up into the cutterhead.

On popular, lightweight, portable planers, the usual causes of snipe are related to the generally lightweight construction of these machines, compared to cast-iron planers. The powerheads of these machines flex up and down, depending on the depth and width of the cut being made. The best way to minimize snipe in the smaller machines is to first plane the material slightly thicker than final thickness, then finish with the lightest possible cut, minimizing cutterhead deflection. Long stock, of course, must be very carefully supported on both ends if good results are expected.

When we talk to woodworkers whose planers start sniping right after they "put in brand new knives," we usually find that they haven't adjusted the knife height properly, or that they've tried different feed roller pressures, bed roller adjustments, pressure bar heights, etc. In these cases, it's best to start from scratch by accurately setting the knives to the cutterhead body, adjusting the feed rollers to the cutting circle, adjusting feed pressure of powered rollers, and the bed rollers to a finish planing height of .002" to .003". Planer manufacturer manuals usually give specific dimensions for all of the above adjustments. You may need very accurate dial indicator-equipped setting devices available through woodworking supply houses.

In summary, to eliminate or minimize snipe, start with material already flat on one side, make sure that your bed rollers are properly adjusted, support the ends of long or heavy stock, and be sure to adjust knife height properly when installing new or resharpened knives. PW

We're constantly working to improve your knowledge (and frequently our own) by looking to experts for advice. This column asks the woodworking industry professionals who make up our editorial advisory board your questions on any woodworking-related topic. Please send our experts your questions about tools, materials, techniques, finishing, or even questions which may not fit into the standard categories. Send them to Ask the Experts, Popular Woodworking, *1507 Dana Ave., Cincinnati, OH 45207 or e-mail us at Wudworker@AOL.COM.*

Louis C. Brickner Jr. is vice president of Engineering and Product Development for Delta International Machinery.

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THE LITTLE SHOP THAT COULD

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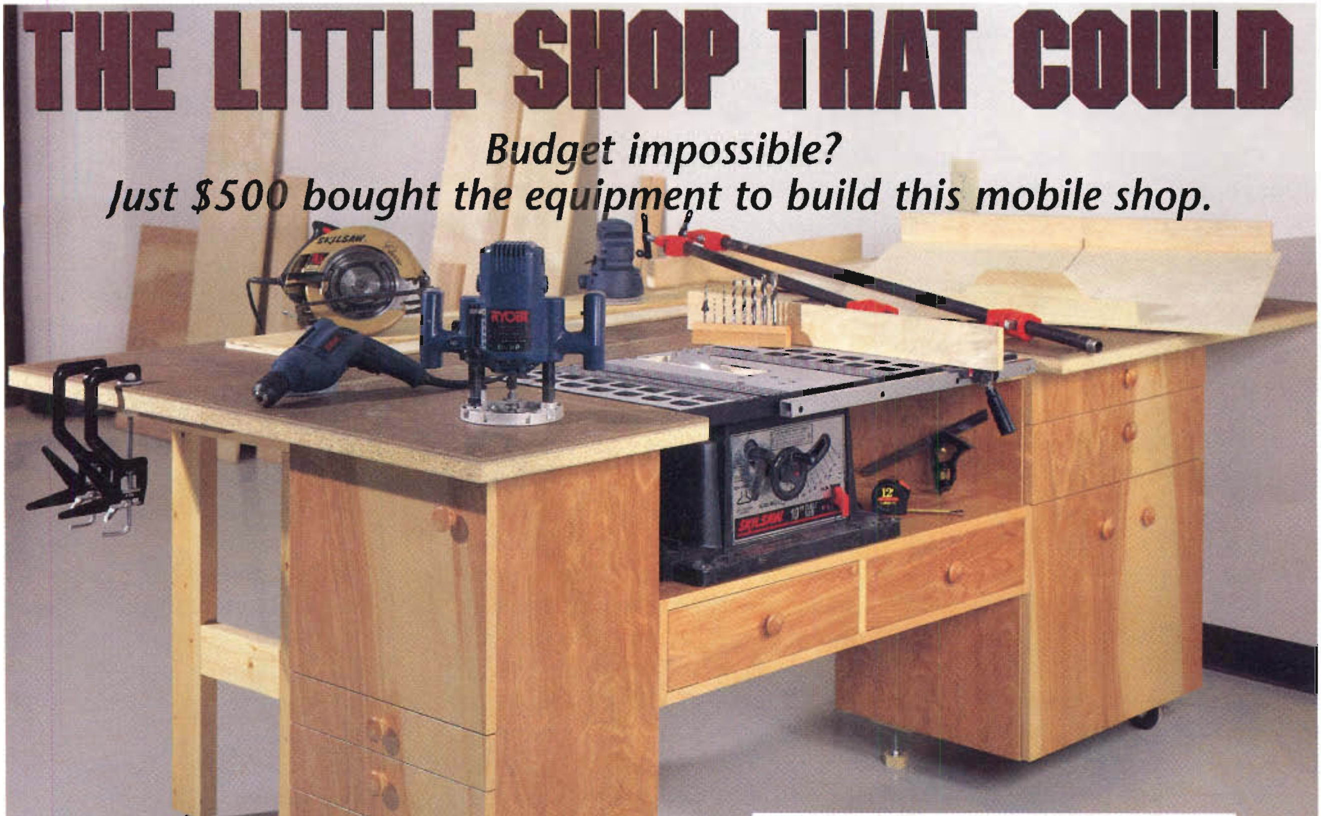


By Steve Shanesy

PHOTO: RON FORTH PHOTOGRAPHY

You say your shop space is too limited? You don't have enough tools (as if anyone does)? You dream about building this or that project if only. . .if only you won the lottery and could put up that climate controlled pole barn that had more machinery and equipment than a dealer's showroom floor? You betcha. But hey, keep your daydreams, just don't let those fantasies keep you from enjoying your craft today.

I've heard many readers say they share shop space with a car or a washer and dryer, so I concluded it would be appropriate for us at your woodworking magazine to set up shop as many of you do — with limited space and an equally limited budget. I challenged myself to put together a shop with no more than $500 to spend on tools and equipment. Secondly, the shop had to be mobile and self-contained — and it had to be small enough to be pushed up against the garage wall so the car could fit or to be stored out of the way under the basement stairs.

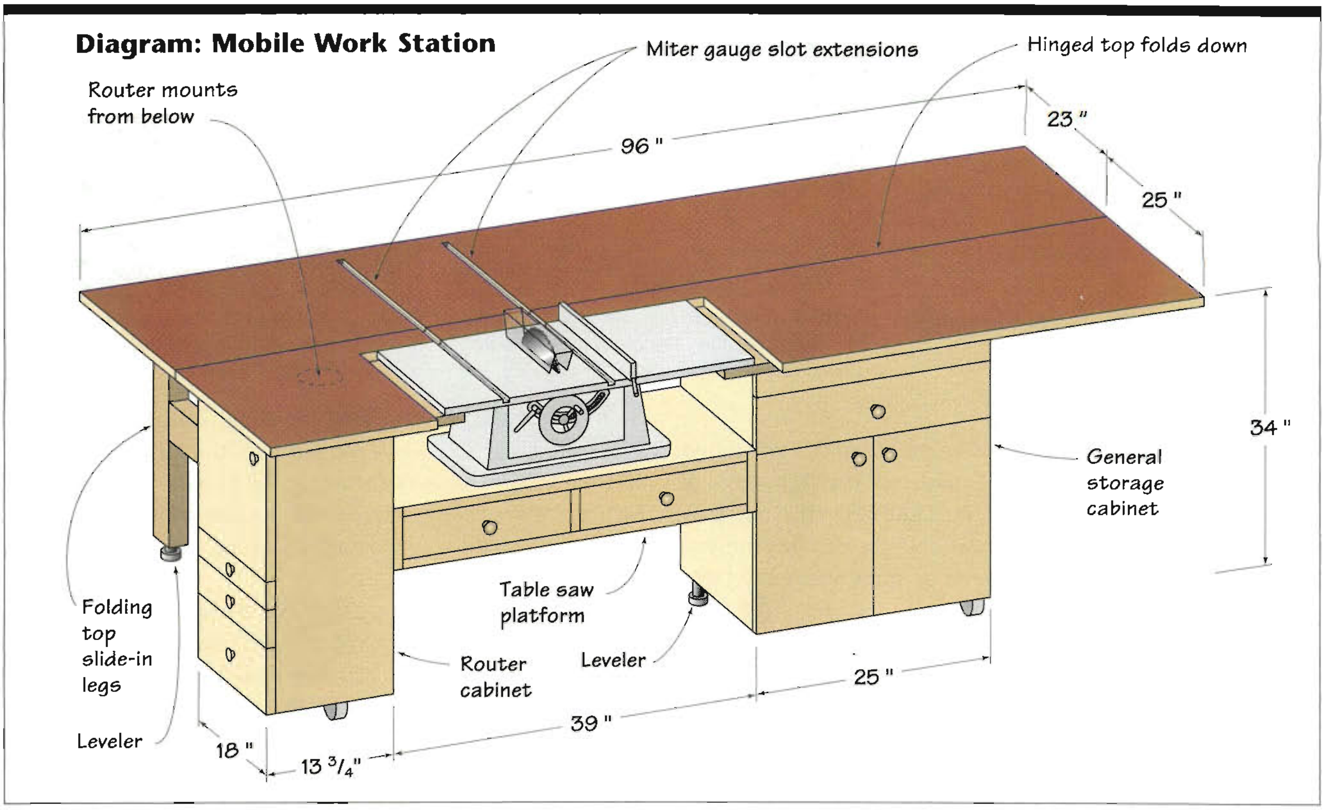
Given these limitations, the shop would still have to be easy to set up, convenient to work in, and able to produce quality projects. After spending an hour researching prices at one of the big home center stores, I was nearly convinced that with more diligent shopping, I could meet the $500 part of the challenge. A couple more hours of noodling with a pencil and paper gave me plans for a mobile, folding work center. Part two of the challenge was solved. Lastly, I decided that to produce quality projects with my limited equipment, I'd have to rely on a few shop-made jigs and a lot of creative problem solving.

Machinery and Equipment Selection

I knew that I wanted to make general woodworking projects that would likely include furniture, cabinets, and smaller projects that might range from jewelry boxes to toys or clocks, picture frames or bird feeders. I also knew that for materials, I'd be using both lumber (already planed to thickness) and various sheet goods like plywood or veneered medium density fiberboard (MDF). Said another way, I wanted to make boxes, big and small, which usually means making flat, straight, rectangular parts with square edges.

To help in my quest for the best prices and features, I made up an equipment list. It included "must buys" and "not necessary but nice" items. To give you an idea of how tough the shopping was, my five "big ticket" items consumed $434 of the $500 budget. These included a Skil 10" benchtop table saw ($179), a Skil Classic 2.5 hp circular saw ($59), a Ryobi 1.75 hp plunge router ($90), a Ryobi D38K VSR corded drill with keyless chuck ($59), and lastly, a Ryobi random orbit sander ($47). In case you were wondering, all these purchases were bought at everyday (not sale) prices.

Diagram: Mobile Work Station



There *were* less expensive tools for sale. The Sears table saw was $159. Routers were available (non-plunge) for as little as $46 and drills could be had for a mere $23. Features played a big part in selection, as long as I knew I could meet my budget challenge. For example, I wanted a plunge router so I could cut precise mortises, among other things. Variable speed and reversing features were important in selecting the drill, and the keyless chuck was an enticing bonus. I really wanted a biscuit joiner but couldn't swing it. Then I remembered I could do much the same work with my router and a 5/32" slot cutter.

The remaining hand tools, a few clamps and a couple measuring devices rounded out my purchases; and they, along with the above mentioned power tools, are listed in the adjoining table. A few basic shop necessities aren't on the list. These are a hammer, pliers, some kind of handsaw and a couple screwdrivers. Frankly, these items would've put me over budget, and I rationalized their absence as follows — if a person doesn't already own these basic tools, he or she has no business buying power tools. Agree?

The Shop in a Box

To get the most performance out of my limited equipment and the most use from limited space, I designed a work station which does all of the following:

- Provides huge extensions for the saw table top, providing greater capacity and safety.
- Features a built-in router table.
- Has ample storage for tools, equipment and supplies.
- Is a stable worktop for both machining and assembly.
- Can be set up in less than two minutes.
- Will accommodate dust collection for saw and router.
- Has multi-outlet plug strip for a convenient electric source.
- Has locking casters for easy roll-out from storage.
- Folds in half for minimal storage requirements.

In building my work station, I used ¾" birch veneered MDF for the storage cabinets, ½" baltic birch plywood for the drawer boxes, backs and fronts, 1⅛" particle board for the top, and a few two-by-fours as legs to support the folding portion of the top. I also used ¼" tempered hardboard for drawer bottoms and to skin the top for a smooth, replaceable work surface. I used full extension metal drawer slides and concealed hinges for the doors. Along with the casters, I spent nearly $250 to build the work station, making it the most expensive "tool" in the project. However, I didn't include this cost in the $500 equipment and tool budget. If you choose lesser quality materials for the tops, cabinets and drawers, *you could get the work* station's cost down to about $175.

MACHINERY	*Brand*	*Choice*	**HAND TOOLS**	*Brand*	*Choice*	**TOOLING**	*Brand*	*Choice*
Table saw	Skil	$179.00	Tape measure	Lufkin 12'	$7.00	Drill bits	Brad point set	$12.00
Circular saw	Skilsaw Classic 2.5 hp	$59.00	Combination square	Generic	$6.50	Countersink		$3.00
Drill	Ryobi DK38VSR	$59.00	Pipe clamp ends	2 pair (at $8.50 ea.)	$17.00			
Sander	Ryobi	$47.00	Small steel bar clamps	2 units	$16.00	**Grand Total**		**$498.50**
Plunge router	Ryobi 1.75 hp	$89.00	File (four in hand)	Nichols	$4.00			

Constructing the Work Station

The principal components of my mobile shop are the folding top, a cabinet to the left of the saw which is a combination router table and storage unit, a general storage cabinet to the right of the saw, and a shallow but stout two-drawer cabinet that is the table saw's platform. It also serves to bridge the two adjoining cabinets together. In the upright position, the hinged worktop is supported by a pair of slide-in-place legs.

Photo 1 *Building the mobile work station begins by chopping the big sheets to manageable sizes with the straight edge jig.*

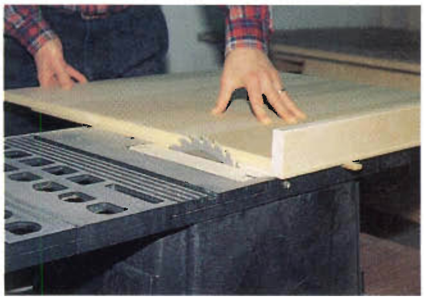


Photo 2 *With the table saw panel squaring jig, I squared one corner of each cabinet part then marked it with a pencil.*

With my newly purchased equipment at hand, I fine-tuned my work station plans then completed my Schedule of Materials, which is included in the PullOut Plans. I had also purchased my locking casters so I was able to establish the station's overall height, 34", the same as most stationary table saws, shapers, etc.

My first cutting task put my new circular saw and straight edge jig to work (see "First Build Three Jigs"), roughing out the cabinet parts from the 4' x 8' sheets of birch veneered MDF *(photo 1)*. For the most part, I was cross cutting the sheets, allowing about a ½" extra length for later squaring and trim. At this stage I was working on a pair of sawhorses with a couple of two-by-fours running below them to support the MDF.

Once I began working with my panel squaring jig on the table saw *(photo 2)*, I was pleased with the jig's performance and the little table saw's cutting ability in general. Granted ¾" MDF isn't especially hard material, but not knowing just what to expect from the saw, I found that a slow, yet steady feed rate produced acceptable results.

I was, however, unhappy with the shower of sawdust that covered me faster than the volcanic ash from Mt. St. Helens on eruption day. This little machine spewed more dust than any table saw I ever operated. I quickly remedied this annoyance by fabricating a "0" tolerance throat plate from ¼" plywood. This at least kept the dust out of my face. A shop vac/dust collector is on the top of my "must have" wish list.

With all the cabinet sides, backs and bottoms now cut to

FIRST BUILD THREE JIGS

After assembling the benchtop saw, the first order of business is making three jigs, all to be used for enhanced sawing operations. The first one is used with the Skil circular saw. Its function is to provide a straight edge to run the base against and a bed on which the saw runs. It also helps for quick setups since the edge is essentially the line of the cut *(photo A)*. This jig plays a major role in cutting the big sheets of MDF down to slightly oversized parts so they can in turn be cut safely and more accurately on the table saw.

My straight edge jig, measuring 12" wide and 60" long, uses a piece of ¼" plywood on the bottom with a ⅜" piece of plywood glued on top. When making this jig, I made sure the bottom plywood edge nearest the blade and the top plywood edge which serves as the saw base's guide are absolutely parallel to each other. Don't use plywood pieces that are much thicker than recommended because you begin to loose depth of cut capacity. Before gluing the plywood together, I cut a ⅛" rabbet on the bottom side of the top piece's long edge. This gives chips and dust a place to go rather than interfering with the saw's straight cut.

My next two jigs are sleds to use with the table saw. Both use the miter gauge slot and each are intended to produce square cuts, a fundamental woodworking requirement. The panel squaring jig *(photo A)* is used to make one square corner (the other corners can now be made square using the table saw fence).

To make this jig, I used another piece of ¼" plywood for the base, a precisely cut hardwood stick that was precision fit in the saw's miter gauge slot, and another piece of hardwood

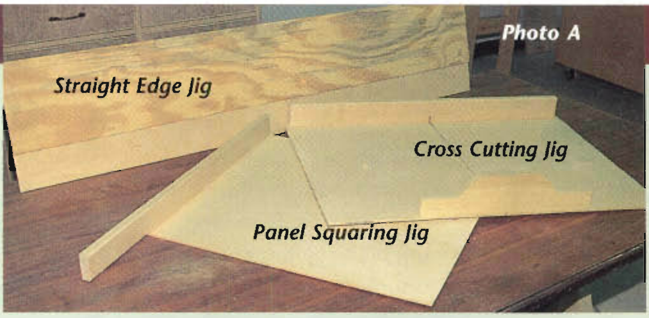


Photo A

for the fence. My sled bottom is 23½" x 26" with a fence that's 2½" x 32". As with the circular saw jig, I cut a small rabbet on the bottom edge of the fence for dust and chip clearance.

To assemble the jig, I set the hardwood stick in the left slot of the saw tabletop and put a "string" of glue down the center of the stick. (I used cyanoacrylate adhesive and with the blade raised as far as possible, set the jigs bottom carefully alongside the left side of the blade.) The idea is to get the sled's bottom right edge in line with the blade. When positioning the bottom, let the stick on the bottom project out on both sides of the jig base. Clamp the stick and bottom in place and let the glue dry. After the adhesive is set, attach the fence. I did this very carefully, making sure the fence was exactly 90 degrees to the blade. I fastened it with screws (one near the blade edge and the second one near the opposite edge). I actually made a slot for the second screw, which allowed me to make slight adjustments by pivoting the fence on the first screw until my angle was perfect. I then added more screws to secure it.

The second table saw sled *(photo A)* is very similar to the first. It will be used primarily for crosscutting pieces to length.

***Photo 3** Each panel is trimmed to final size using the saw fence cutting opposite edges to the squared corner.*

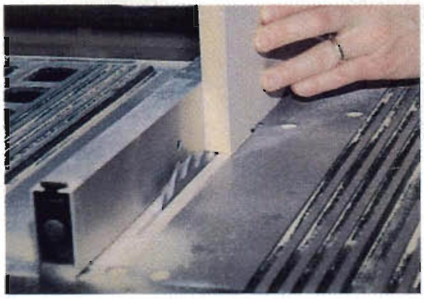


***Photo 4** Rabbets are cut running the panel on edge against the fence which is set to ¼" with the blade set about 11/16" high.*

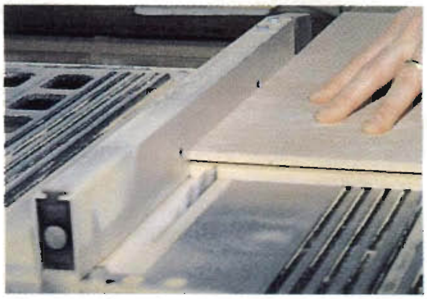


***Photo 5** After adjusting the fence and blade height, the rabbet is completed running the panel flat on the saw table.*

rough size and one corner squared, I used the table saw fence to cut the remaining untrimmed edges *(photo 3)*. This work went quickly and I moved on to cutting my rabbet joints on the table saw. I always cut rabbets in the following way — first cutting with the panel run on edge *(photo 4)*, followed by a second cut with the panel run flat *(photo 5)*. Even if I had the money in my budget, I'd do this the same way and *not* buy a dado set.

WARNING

When using the two cut table saw rabbeting method, make certain you don't stand behind the blade. At the completion of the second cut, the waste piece can be "shot back," sometimes at high velocity. This is often referred to as the "hidden arrow."

The first cut is made with the saw blades set ¼" from the fence. The blade height is slightly less than the thickness of material that the rabbet will receive (in this case, ¾"). The second cut is made with the fence set for the thickness of the material that the rabbet will receive, *including* the thickness of the saw blade. The blade height is set to fully cut away the waste piece to form the completed rabbet. The part being rabbeted is run flat on the saw. With the sides, bottom and top stretcher rabbeted, the back always fits in neatly and plays a big role in squaring the cabinet. As I ran all my cabinet parts to form the rabbets, I again found the saw performing well. I was especially pleased to find that the small fence was adequate and did a good job, remaining firmly in place.

I had also formed a rabbet as described above on the rail ends of the general purpose storage cabinet. This required me to make a ¼" stopped dado on the inside front of the cabinet sides. I accomplished this with the regular saw blade, making two passes to achieve the ¼" wide dado that was ⅜" deep. I had made a reminder on my cutting list that making this dado would dedicate each side as either a right or left. The reminder meant that I had to set the fence for 9¾" and run the right side with the top edge against the fence in a normal method of pushing the work into the blade. However, to cut the left side dado I had to carefully lower the work over the blade, then push the work on through to complete the cut, again with the the side's top edge against the fence.

With all my cabinet joinery complete, I went directly to assembling my cases using glue, a hammer and nails *(photo 6)*. I like to clamp across the case when fastening to make sure the joint is pulled tight and my finished cabinet dimensions are achieved. Because I wanted the case that supports the table saw to be extra rigid, I glued and *screwed* it together.

To finish the MDF edges of the cabinet fronts, I used preglued iron on birch veneer. (Of course, we didn't have the budget for an iron in this project, so you'll have to "borrow" from the laundry room.) To make sure you don't mess up your iron bottom, use a piece of craft paper under it. That way you can return it without making any apologies or replacement promises. If you haven't used veneer tape before, you'll soon see that it's simple and efficient. The bottom side is coated with hot melt-type glue. With my iron set to high heat, the edging sticks down easily by making a slow, but steady pass *(photo 7)* over the length of veneer set in place. A flat file trims the tape over-

***Photo B** To space the guides accurately, place them in the slots, apply glue, then set the sled in place.*

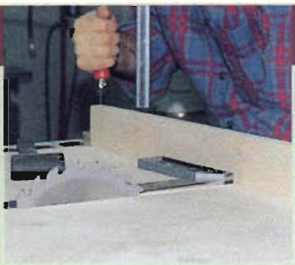


***Photo C** I clamped boards in place to help align the sled perfectly.*

Unlike the first table saw jig, its fence is on the opposite side and backs up, rather than leads, the work. It also uses a stick in each miter gauge slot. Because this sled's leading edge is sawn through, it's necessary to add a "bridge" between the bottom's sawn halves. This jig has a bottom that's 23½" x 33". The fence is 2½" x 32"; and the bridge is 4" x 17". I followed the same assembly procedure as the earlier one, first gluing the sticks in place *(photo B)*, then attaching the fence, making sure it also was exactly 90 degrees to the blade *(photo C)*. Since the bottom is glued to the sticks with the blade all the way down, I screwed the bridge in place after the glue dried. Next, I set the jig in the slots and, while holding it down well clear of the blade, raised the blade all the way up. I turned the motor off and continued to hold the jig in place until the blade stopped coasting.

After a couple test cuts using both new jigs, I was satisfied with their performance and was now ready to begin making the three cabinets for the work station.

Photo 6 *Cabinets are assembled with glue and nails. A clamp pulls the parts together while fastening.*

Photo 7 *After assembly, the front edges of the cabinet are finished with veneer that has hot melt glue applied to the back side.*

Photo 8 *The saw table platform cabinet is screwed to the back of the router cabinet.*

hang quickly and easily using the teeth on the edge of the file.

With my cabinets assembled, I proceeded to screw them all together. The plan calls for all three boxes to be flush in the back, so screw them together indexing off these surfaces (although technically the router cabinet back butts to the saw platform cabinet's left side). I measured down 9⅞" from the top of the cabinets to mark the location of the saw platform cabinet's top edge. After drilling eight clearance holes in the sides of the saw cabinet, I set the router cabinet on its face and carefully positioned the saw cabinet. I then screwed the two cabinets together *(photo 8)*. Next, I positioned the general purpose storage cabinet so that when I tipped the other attached cabinets over to be right side up, I could clamp the unattached case to the others *(photo 9)*. I fine-tuned the location, reclamped it, then screwed the third cabinet to the first two.

Before attaching the casters, I took a length of two-by-four and screwed it to the back of the general storage cabinet and the side of the router cabinet so it was flush to the top edge of both. This very effectively completed the bridging of these two cabinets and would also act as a "joist" for the worktop.

With my cabinet assembly finished, I bolted my locking swivel casters on the two end cabinet bottoms. Below the router cabinet, I positioned the casters in the center as close to the sides as possible. For the other cabinet, I attached them to the outside right corners.

Making the Top

Using my circular saw and straight edge jig, I split my heavy particleboard top lengthwise leaving one piece 25" wide. This piece covers the cabinets. Again using my straight edge and circular saw, I made a cutout in the top for the router base so it could attach directly to the ¼" tempered hardboard that will cover the particleboard subtop. I positioned the router cutout near the back left corner of the router cabinet to give me maximum infeed space and ample room in front of the router. Next I cut the tempered hardboard to the same width as the particleboard and, after aligning the edges, screwed it down to its subtop around the perimeter. I then made another cutout 20½" wide x 37" long for the table saw *(photo 10)* in this now sandwiched top. The cutout allowed for 1" top overhang in the table saw as well. The cut started 18" from the left, or the router table end. I added more screws to the top at the perimeter of the cutout.

I drilled clearance holes through the cabinet stretchers, positioned the top over the cabinets leaving the appropriate overhangs, and screwed it in place from inside of the cabinets. This work station was starting to look like something now, especially when I set my table saw in place.

I quickly determined that while the table saw top was flat enough, its relationship to its molded plastic base made it impossible to align with the larger surrounding worktop when merely fastened to its platform below. I overcame this problem by mounting wood brackets under the worktop overhang *(photo 11)*. This allowed me to shim the table saw top exactly where I wanted it — just a skosh proud of the surrounding worktop. Of course, I didn't want the saw suspended from the brackets, even a little, so I shimmed the saw base relative to the platform then fastened the saw base in place.

Next I carefully extended the saw table's miter gauge slots in the worktop hardboard by handsawing, making my jigs even more reliable. Before attaching the folding section of the top with a heavy-duty, continuous (some folks call them piano) hinge, I fabricated the removable legs that would support it.

To make the legs, I cut my two-by-fours to length (your length can change according to the type of levelers you select) and glued-up the assemblies using two #20 biscuits for each joint *(photo 12)*. My router milled the biscuit slots using a 5/32" slot cutter in combination with a ⅞" bearing. This method of cutting biscuit slots worked well and produced a strong joint.

To the top of both leg assemblies, I glued and screwed a ¾" MDF plate that's part of the sturdy, easy on/easy off, removable leg system. The plate slides into a double thickness MDF assembly that captures the leg plate on two sides *(photo 13)*. I found that adding two pieces of typing paper under the capturing MDF assemblies added just the clearance needed for a snug, yet non-binding "push in" fit.

Before hinging the two tops together, I screwed the hardboard skin to the fold-down side of the particleboard subtop.

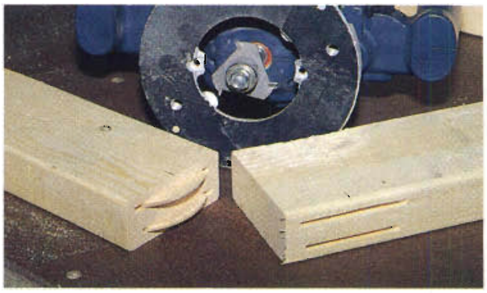


Photo 12 *With no biscuit joiner in the budget, a router does the trick. Here double biscuit leg joints are made using a 5/32" slot cutter with a ⅞" bearing.*

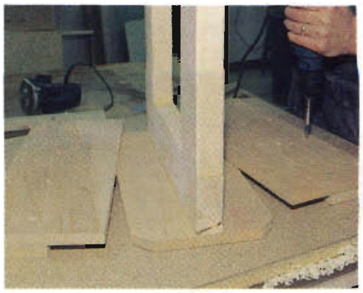


Photo 13 *The removable legs of the folding top sleeve into mating parts screwed to the top's underside.*

Photo 9 *In turn, the general storage cabinet is screwed to the other two while held in place with a clamp.*

Photo 10 *The straight edge saw jig and a plunge cut were used for making cutouts in the top.*

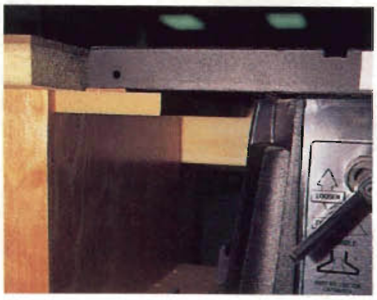


Photo 11 *Brackets and shims were used to align the saw tabletop to the worktop. The brackets were screwed to the top.*

Then I screwed the 6' long continuous hinge to the top attached to the cabinets *(photo 14)*. With the leg levelers installed and the legs slipped in place, I set the folding top in position. Before fastening the hinge to this top, I adjusted the tops with the leg levelers until the seam of the two tops were flush along its length. Now I attached the other leaf of the hinge to the folding top.

The worktop was complete when I extended the miter slot grooves into the folding top. I did this using the straight edge guide and the circular saw set to make just a ¼" deep cut through the hardboard.

Making the Doors and Drawers

As I contemplated finishing my work station, I sighted across it, table saw in place. I had a top that looked as big and flat as the back forty acres of a Nebraska wheat farm. In reality, it's large enough to set up an auxiliary fence *(photo 15)* to the right of the blade and crosscut to the center of an 8' sheet of plywood.

It was a much easier task cutting out drawer parts and door fronts with the work station fully assembled. Following my Schedule of Materials, I cut my parts following the same procedures of rough-sizing, squaring one corner, then finish cutting to size as I had done with the cabinet parts. I made rabbets on the drawer sides, as I did for the cabinets using the two-cut system on my table saw. I also cut the grooves for the drawer bottom in the sides and subfront, making two passes over the table saw blade.

I assembled the seven drawers with glue and nails as before, then slipped the bottoms in through the back, checked the drawers for square, then nailed the bottom into the drawer back. With one exception, which I'll get to later, all drawers were hung using full extension, ball-bearing, metal drawer slides. The drawer boxes, minus their screw-on finished fronts, were installed, two each in all three cabinets.

That seventh drawer box really isn't a "drawer" at all, but a handy, removable dust bin below the router tabletop. As such, I didn't want to use metal slides that would get mucked up by all the router dust and leave gaps for more dust to fall into the drawers below. Instead, I made this bin just 1/16" smaller in width and length than the cabinet interior and screwed ¼" thick strips on the cabinet sides to work as drawer runners.

Next I cut out the door and drawer fronts. The dimensions given for these parts in the Schedule of Materials are for finished sizes. When I use veneer tape, I deduct 1/32" for each veneer edge. My finished sizes allow for a "heavy" 1/16" gap all around the doors and drawers.

To mount the fronts easily, I predrill clearance holes in the drawer subfronts and apply double sided tape to the outside. I then carefully set the front in place, pull the drawer out, clamp it, then secure it with screws through the subfront. Any minor irregularities are taken care of with the adjusting screw slots provided on the slides.

The doors were hung using concealed, European-type hinges. They offer adjustment in three directions, making them a dream to use *once* you understand how to mount and use them. Because mounting the hinges on the doors required a special and somewhat expensive drill bit, I took my doors to a local cabinet shop and had the six holes drilled.

After installing the door and drawer pulls, I mounted the fused electric outlet strip on the side of the router cabinet below the folding top. Except for sanding and finishing, the work station, for this stage at least, was complete. As I sanded the cabinets and then brushed on a clear finish, I started to plan my next projects. I'll need a shop-made router fence; some drawer inserts for more organized storage; some fixtures, perhaps for aids to clamping; and, of course, more jigs. I have lots of projects in mind, and as the budget allows, more tools and equipment to add. After eating that fountain of dust from the table saw, a shop-vac/dust collector is way up on my list. Now let's see, Father's Day is just around the corner, and if I can drag enough dust into the house over the next few weeks, someone might just be motivated to help make that wish come true. Like I said earlier, sometimes solutions come from a lot of creative problem solving!

Photo 14 *The continuous hinge for the folding top was first attached to the fixed top.*

Photo 15 *By clamping an auxiliary fence parallel to the blade, the width of cut capacity is greatly enhanced.*

***Steve Shanesy** is editor of* Popular Woodworking. *He built his first project years ago with a lot less than $500 worth of tools; a time when ignorance was bliss and frustration and fun were at equally high levels.*

CHOOSING THE RIGHT SAW BLADE

It's the most important and cost effective way to improve your work and your safety.

By Hugh Foster

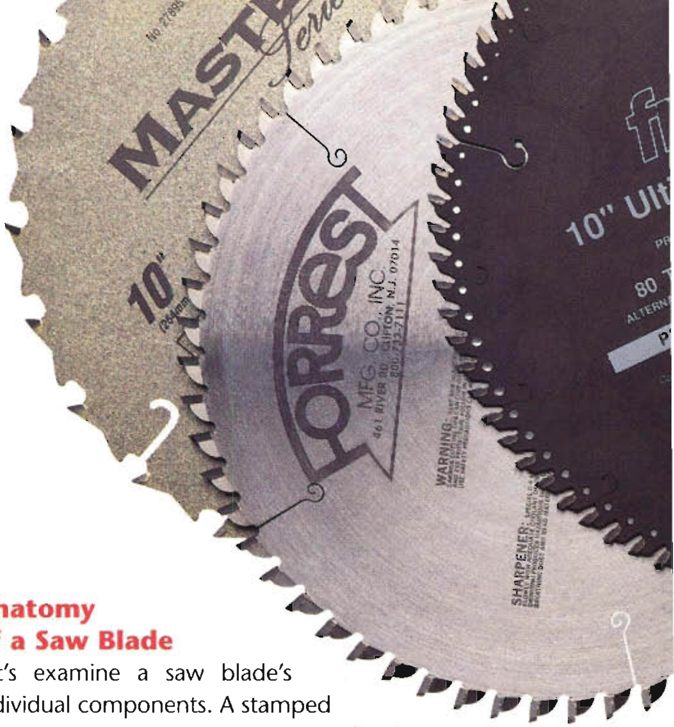
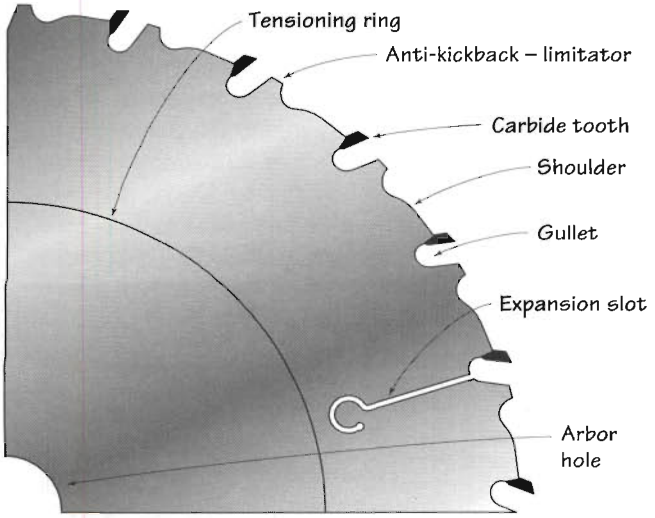


PHOTO: RON FORTH PHOTOGRAPHY

Perhaps more than any other single change you can make in your shop, choosing the right saw blade will improve your work and make it safer.

While we spend lots of time thinking about which table saw to buy, most of us give little thought to which blade to use. We should remember that there's no ideal, all-purpose blade because of variables like rpm, feed speed, blade height above the table, and tool approach. In his excellent book *Chisels on a Wheel,* Jim Effner reminds us to consider several factors when we select a saw blade. To start with, it must be the proper diameter to fit the saw. Then we must ask: What are we cutting and how close to finished do we want the cut to look? Are we ripping or crosscutting? How fast must we push the stock through the saw?

According to Effner, the correct blade can be chosen by remembering one basic precept: It's very difficult and dangerous to cut very thin materials using a blade with very few teeth. So he'd have us divide the tool's circumference by the number of teeth — a 10" saw with 40 teeth has a tooth spacing of just a little more than ¾". So it's a general rule to cut with at least one saw tooth always in the material. Exceptions to this rule are tough or thin material, which require a blade with more teeth, and softer material, which requires fewer teeth.



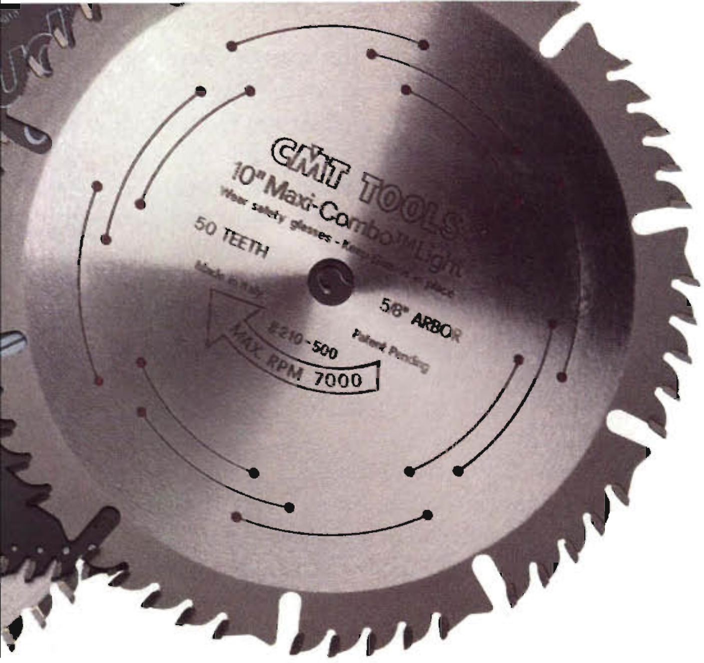
Anatomy of a Saw Blade

Let's examine a saw blade's individual components. A stamped blade is cut approximately two-thirds of the way through the material; and the remaining one-third is stretched until it tears. This creates stresses in the body which can cause problems with flatness that may appear only after the blade has been used. Stamping operations can only be done with blades made of soft material. High quality, modern blade bodies are laser cut rather than stamped and can be made of harder material. Thus they start and remain truer, even after years of use. Check your saw blade for run-out with a dial indicator. The run-out should be less than .005".

Good blades have expansion slots cut in the body to control the heat build-up during use. These slots allow the rim to expand without buckling as heat builds up at the cutting edge. Originally, these slots were made fairly wide and ended with a larger hole. The design was excellent for expansion, but the blades were very noisy due to air turbulence whistling in the openings. Some manufacturers used plugs of different shapes, which reduced noise, but the plugs tended to fly out at speeds of more than 160 miles per hour. A number of manufacturers have since retained the original slot's effectiveness and the plugged slot's quietness by making a question mark-shaped slot. The plug is thus part of the body, allowing for necessary expansion, yet eliminating noise.

Today, choosing between high-speed steel or carbide blades is almost a moot decision. The high-speed blade is becoming ever harder to find. Three disadvantages related to cost render them out of fashion and considered by many obsolete: They cost more to make, they break more often, and sharpening must be more precise than most sharpening services can provide regularly and reliably.

A good set of blades requires a substantial investment. Choose carefully, buy the ones you really need, and take good care of them. Carbide blades cost more than steel blades, but the higher cost is offset by longer life, lower maintenance and improved cutting performance. They last as much as 50 times longer when cutting hardwoods, and as much as 400 times longer when cutting synthetic materials. The specific carbide mixture must be appropriate to the cutting job, but you can



count on name-brand manufacturers to use the appropriate grade of carbide.

In *The Table Saw Book,* author Kelly Mehler suggests that though they're not particularly marketed this way, saw blades are sold in three different categories: consumer, contractor and industrial. As you can imagine, blades get more expensive as they move up a grade, so know what you're buying. Most home shop woodworkers probably don't need industrial blades. However, the contractors and the hobbyist woodworkers that I know tend to buy either the model they regard as "the best" or the cheapest model that they can use briefly and throw away — so much for the mid-price models.

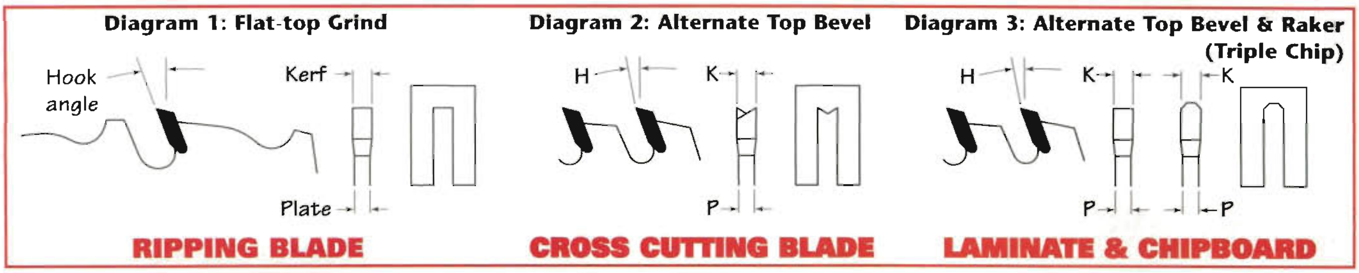


Diagram 1: Flat-top Grind
Diagram 2: Alternate Top Bevel
Diagram 3: Alternate Top Bevel & Raker (Triple Chip)

RIPPING BLADE
CROSS CUTTING BLADE
LAMINATE & CHIPBOARD

DIAGRAMS COURTESY OF FREUD

Good blades are pre-tensioned under enormous pressure using computer controlled rollers to ensure many years of smooth, flat operation. Blades used to be hand hammered for tension, and good and bad ones abounded. Today, cheap blades often aren't tensioned at all. Look for a faint ring about three-fourths of the way from the center of the edge, the sign of the tensioning process.

Noise is always an issue when sawing. To reduce the noise level in your shop, select a blade with special anti-noise slots, which have been filled with a sound-deadening resin. While you should continue to wear your hearing protection when sawing, you can test this noise reduction by lightly striking the body of a regular blade and compare the ringing sound with the dead sound made by the same stroke on a "quiet" blade. When your saw is equipped with this blade power, the difference is truly remarkable.

Anti-kickback Design

Just as noise is a safety issue, so is anti-kickback design. Most woodworkers have experienced saw blade kickbacks from overfeeding. We know these can be dangerous, and happen so quickly that it's often impossible to react before being injured. Anti-kickback design effectively reduces kickbacks by preceding each tooth with a limitator which restricts the tooth bite to the maximum safe amount. Anti-kickback features are required by law in Europe. Incidentally, anti-kickback blades make having a two-wrench arbor (or an arbor with an arbor lock) very desirable; there's not much tooth to grab onto with the wedged-in board usually used to hold a blade while attaching or removing an anti-kickback blade.

Thickness relative to power required to make a cut is always an issue, especially for the often underpowered, home shop saw. Thin kerf blades remove less wood than standard thickness carbide blades, so they require less horsepower for equally good results. Thin kerf blades also do wonders to reduce the aggressive self-feeding characteristics of radial arm saws. In the past, some thin kerf blades were inferior because of poor blade body tensioning, misaligned teeth, carbide chipping, flexing and warping. Modern thin kerf blades are more than 25 percent thinner than standard units, but laser cutting and pre-tensioning have eliminated many earlier problems. To further improve the thin kerf design, some manufacturers have given blades a Teflon coating to prevent heat build-up caused by friction. This produces a blade that's easier to feed and requires less power. Thin kerf blades also require less energy to run, so they're ideal for most hobbyist and contractor saws.

A blade's effective life varies widely and is difficult to guarantee. This is because the manufacturer has no control over the material being cut (chemical content, moisture content and strength), the effectiveness of chip and dust removal, the mechanical conditions of the process, the feed and rim speed of the tool process, nor the correctness or appropriateness of tool geometry. In other words, a blade's life depends more on you than your blade manufacturer.

WOOD'WORDS (wood'wurds) *n.*

carbide: *A metal powder and binder mixture molded at high temperatures and pressures. Wear occurs as the grains of the hard metal powders break away.*

hook angle: *The angle the face of the tooth makes with a line projecting radially from the center of the bore and comes in contact with the tooth. Ranges from 20 degrees to -7 degrees.*

kerf: *The cut made by any type of saw.*

rakers: *A tooth in a combination saw blade which does not reach to the periphery of the other teeth, its purpose being to clear the sawdust.*

Blade Tooth Design

Blades with more teeth get dull faster, run hotter, cut more slowly, and require more feed pressure, especially when ripping. A blade with more teeth will generally produce a smoother cut, but if you edge-joint boards before gluing, a glass smooth cut isn't really necessary. Use the blade with the fewest teeth possible to get the job done when ripping. Blades with more than 40 teeth should be reserved for crosscutting and cutting plywood or other synthetic materials.

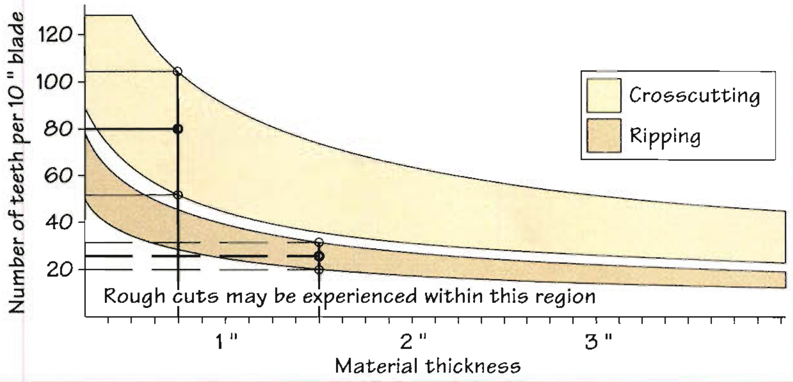
Blades with flat-top teeth are designed for ripping ***(diagram 1)***. Deep gullets eject large chips. Plus these blades take more power to run than other types of blades, but they're the best choice for fast, heavy-duty ripping. Have you noticed that your saw stalls only when you're ripping? Now you know why.

Blades with alternate top bevel (ATB) ***(diagram 2)*** are used for cross cutting. ATB design has the tops of adjacent teeth ground at alternating angles to go through the wood with a shearing action, producing a tear-out free cut across the grain. The bevel will range from five to 40 degrees. The steeper the bevel, the smoother the cut, but the more fragile the teeth. The shallower the bevel, the longer the teeth stay sharp.

Here's another difference between flat-top and ATB blades. When you're cutting rabbets or dadoes with your standard table saw blade rather than a dado set or router, the bottom of the slots won't come up flat with ATB blades. On the other hand, flat top blades are harshest on contact with wood, and are thus more likely to leave tear-out when cross cutting.

Another variant is the triple chip grind ***(diagram 3)***. This blade is particularly useful when cutting brittle materials like chip board and laminates, for it features one flat-top tooth followed by a slightly higher trapezoidal tooth. The higher, more narrow tooth pre-cuts the materials to help eliminate chipping.

Diagram 4: Recommended teeth per material thickness



As you might imagine, there's an optimum number of teeth for different sawing situations. While the notion of having two or more teeth in the material at a given time may seem somewhat vague, Freud's chart ***(diagram 4)*** explains why this works.

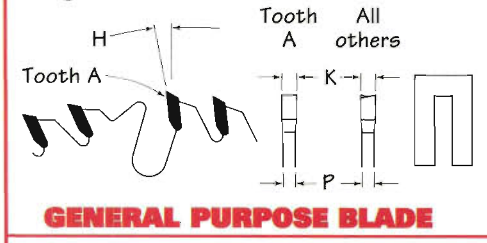
Even after seeing the difference between ripping, cross cutting, chip-free and thin-kerf blades, it's a sad truth that many woodworkers put a blade on their saws, then forget what kind it is and leave it there until it's too dull to cut anything well. These woodworkers should use combination blades ***(diagram 5)***, which are ATB blades with rakers. If that's the kind of woodworker you are, you can probably put on a 10" 50-tooth combination blade and usually be satisfied. If you have to switch from ripping oak to cross cutting plywood without changing blades, choose a general purpose combination blade. These blades balance the large gullet and flat-top tooth required in ripping with the high tooth count ATB required in a crosscut blade. Each set of teeth has one flat-top tooth followed by four alternate top bevel teeth. Between each set of teeth is an extra deep gullet for proper chip removal when ripping; the large gullet makes the anti-kickback design a necessity to ensure safety. The 10" blades of this variety have 50 teeth, and 12" blades have 60 teeth. Their ideal working range above the stock is ¼" to 1½" for ripping and ¾" to 3½" for cross cutting, but expect some degradation in finish of the cut with thicker or thinner stock.

While these are fine blades, if you want more from your woodworking, you'll have to conclude that no single blade is right for every sawing application. Continually sawing with the wrong blade makes extra work, wastes time and eventually shortens the life of the blade. Getting the right cut results from a combination of a good blade, a good machine and a good sawyer.

Sharpening

Sharpening is a real issue when it comes to saw blades. It's best not to continually use a blade until it gets so dull that it will hardly cut. That actually shortens blade life by causing more material to be removed and can be unsafe. You should avoid trying to touch up the blades yourself between sharpenings. The best sharpening services use highly automated machines to reproduce the factory edge of your blades. If your blades sometimes seem less effective after they've been sharpened, there's a reason — many sharpeners, particularly those that grind a tooth at a time, can't or won't follow the manufacturer's guidelines. It pays to have your blades sharpened regularly — by an expert. Since the quality of local sharpening is so variable, we're almost left with a simple choice in the matter — either cherish an excellent local sharpening service or buy Forrest brand blades. Forrest is the only manufacturer I know of who provides a quick, accurate and reasonably affordable sharpening service for their own brand blades. This may not make them the best blades, as some claim, but it surely makes them among the most accurately resharpened!

Diagram 5: Combination



If your blade is sharp and clean, if its characteristics match those required by the cut you're about to make, and if your saw is properly adjusted, all you have to do is make sure your safety gear is in place, and start cutting. After all, you're not making projects until you start making sawdust. PW

***Hugh Foster** is an author, woodworker and high school teacher from Manitowoc, Wisconsin.*

PullOut™Plans #91

Popular Woodworking®

Carefully open staples to remove plans, then bend them closed again.

Garden Projects $500 Shop Rocking Horse Boomerang

Schedule of Materials: $500 Shop

No.	Item	Dimensions T W L
Router Cabinet		
☐ 2	Sides	¾" x 13" x 29"
☐ 1	Back	¾" x 17½" x 28¾"
☐ 1	Bottom	¾" x 13" x 17½"
☐ 1	Top stretcher *(front)*	¾" x 4" x 17½"
☐ 1	Door	¾" x 18" x 14⅝"
☐ 1	Drawer front	¾" x 18" x 3"
☐ 1	Drawer subfront	½" x 2½" x 15 11/16" + ½"
☐ 1	Drawer back	½" x 2" x 15 11/16" + ½"
☐ 2	Drawer sides	½" x 2½" x 12"
☐ 1	Drawer bottom	¼" x 11¾" x 15½" + ½"
☐ 1	Drawer front	¾" x 18" x 3⅞"
☐ 1	Drawer subfront	½" x 2¾" x 15¼"
☐ 1	Drawer back	½" x 2¼" x 15¼"
☐ 2	Drawer sides	½" x 2¾" x 12"
☐ 1	Drawer bottom	¼" x 11¾" x 15"
☐ 1	Drawer front	¾" x 18" x 7"
☐ 1	Drawer subfront	½" x 5½" x 15¼"
☐ 1	Drawer back	½" x 5" x 15¼"
☐ 1	Drawer side	½" x 5½" x 12"
☐ 1	Drawer bottom	¼" x 11¾" x 15"

Schedule of Materials: $500 Shop

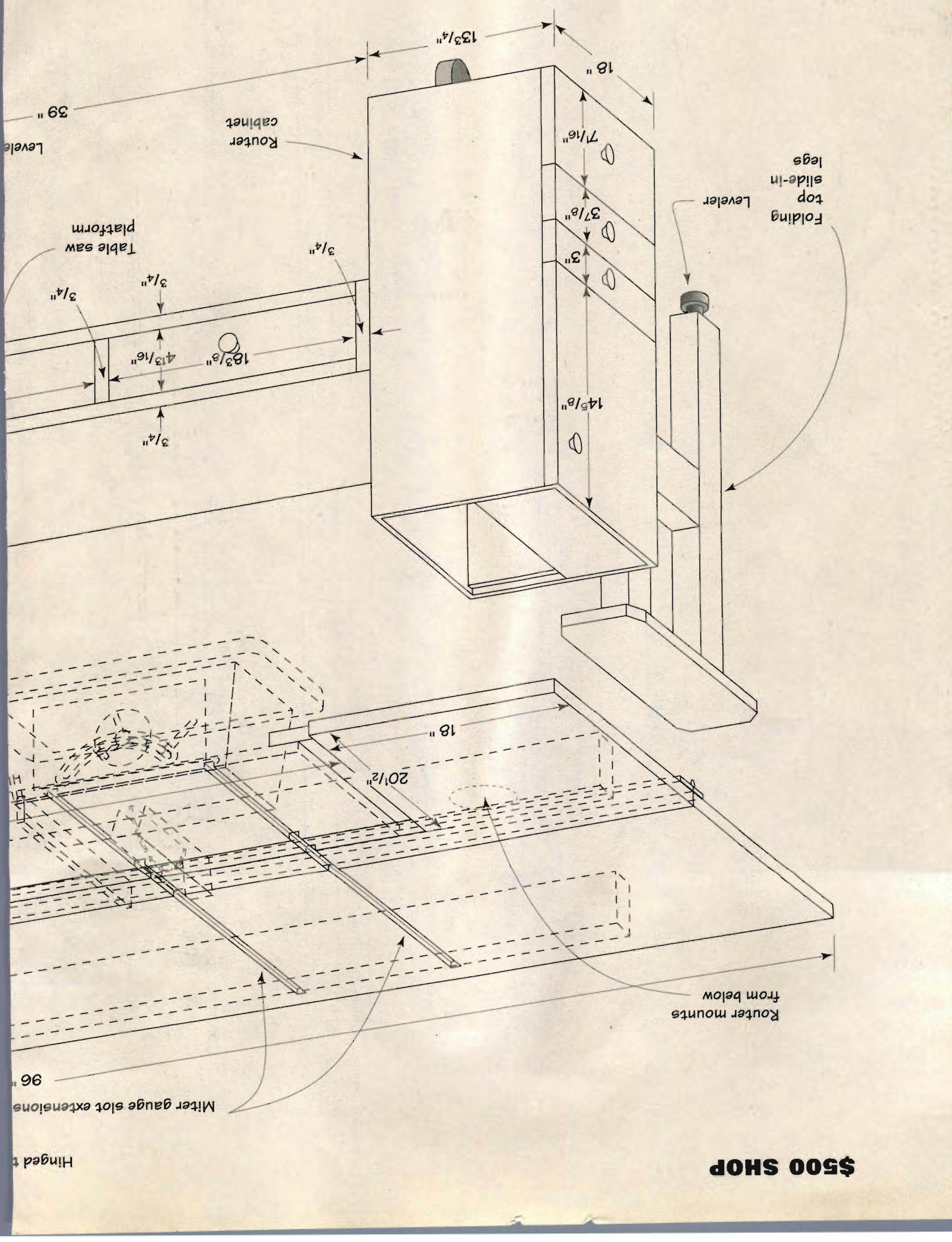
No.	Item	Dimensions T W L
Table Saw Platform		
☐ 2	Sides*	¾" x 5" x 18"
☐ 2	Top & bottom*	¾" x 18" x 39"
☐ 1	Back*	¾" x 5" x 37½"
☐ 1	Partition*	¾" x 5" x 17¼"
** All butt joints, glued and screwed. Top, bottom, overlay sides, back, partition.*		
☐ 2	Drawer fronts	¾" x 4⅞" x 18 5/16"
☐ 2	Drawer subfronts	½" x 4" x 17 3/16"
☐ 2	Drawer backs	½" x 3½" x 17 3/16"
☐ 4	Drawer sides	½" x 4" x 16"
☐ 2	Drawer bottoms	¼" x 15¾" x 16⅞"

Schedule of Materials: $500 Shop

No.	Item	Dimensions T W L
General Storage Cabinet		
☐ 2	Sides	¾" x 17 3/16" x 29"
☐ 1	Back	¾" x 24½" x 28½"
☐ 1	Bottom	¾" x 17 3/16" x 24½"
☐ 2	Stretchers	¾" x 4" x 24½"
☐ 1	Rail	¾" x 4" x 24¼"
☐ 1	Drawer front	¾" x 25" x 4"
☐ 1	Drawer subfront	½" x 3" x 22 5/16"
☐ 1	Drawer back	½" x 2½" x 22 5/16"
☐ 2	Drawer sides	½" x 3" x 16"
☐ 2	Drawer bottoms	¼" x 15¾" x 22"
☐ 1	Drawer front	¾" x 25" x 5¾"
☐ 1	Drawer subfront	½" x 4½" x 22 5/16"
☐ 1	Back	½" x 4" x 22 5/16"
☐ 2	Sides	½" x 4½" x 16"
☐ 2	Doors	¾" x ¾" x 12 7/16" x 18¾"

Schedule of Materials: $500 Shop

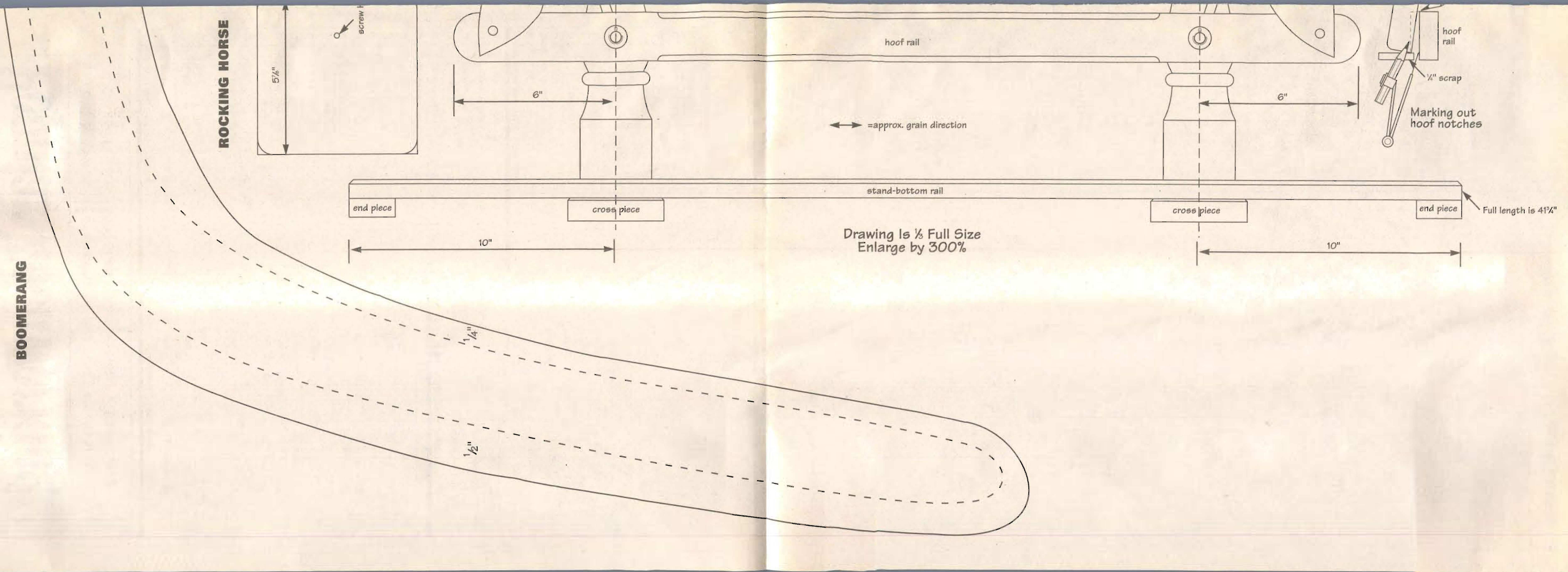
No.	Item	Dimensions T W L
Worktop		
☐ 1	Top 1⅛" x 25" x 96"	*(skin with ¼" hardboard)*
☐ 1	Top 1⅛" x 23" x 96"	*(skin with ¼" hardboard)*
☐ 1	Beam 1½" x 3½" x 59"	
☐ 1	Beam 1½" x 3½" x 56"	
Legs		
☐ 4	Verticles	1½" x 3½" x 27"
☐ 2	Top rails	1½" x 3½" x 16"
☐ 2	Stretchers	1½" x 3½" x 9"
☐ 2	Top plates	¾" x 8" x 16"
☐ 4	Mounting brackets	¾" x 4" x 16"
☐ 4	Mounting brackets	¾" x 7" x 16"



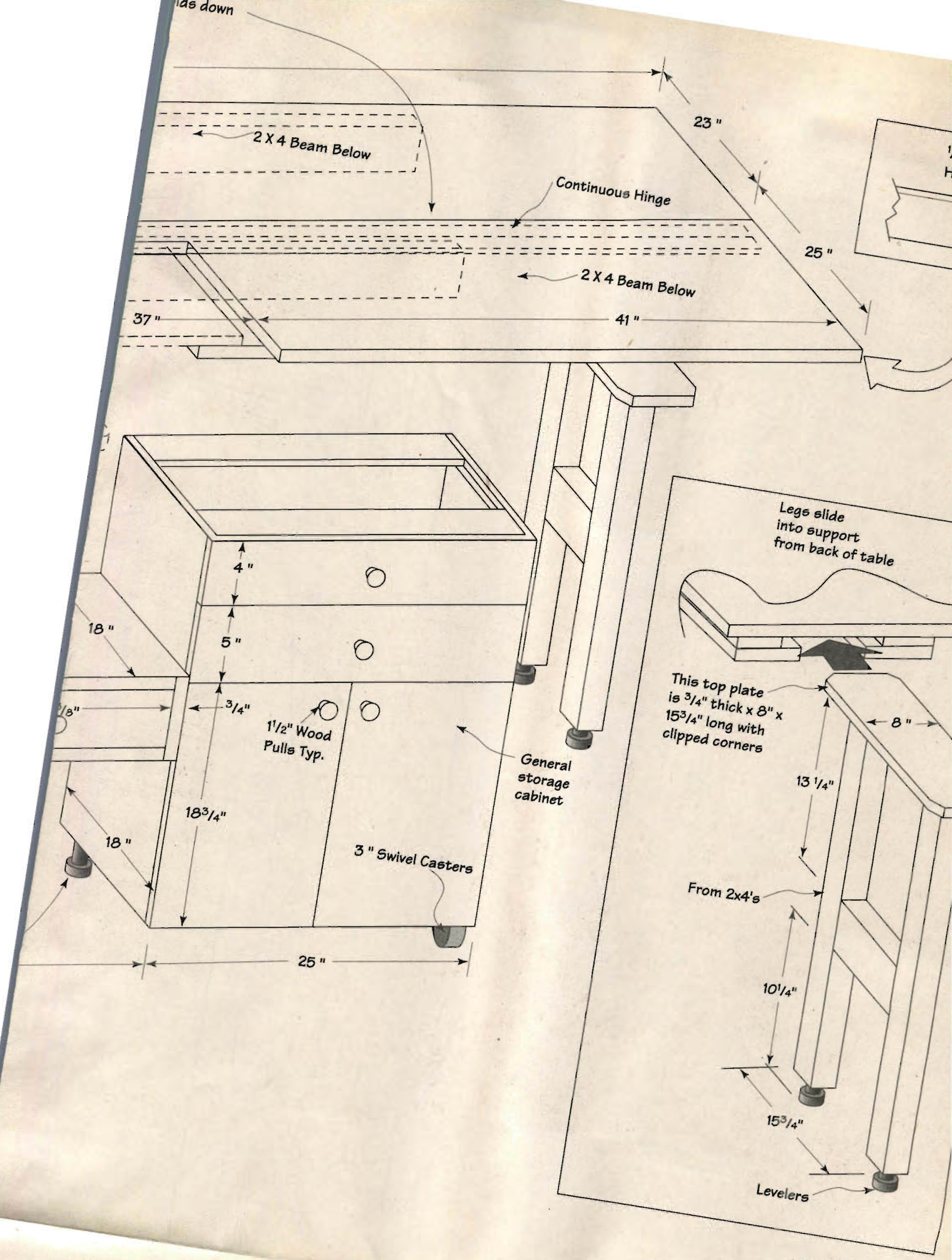
$500 SHOP

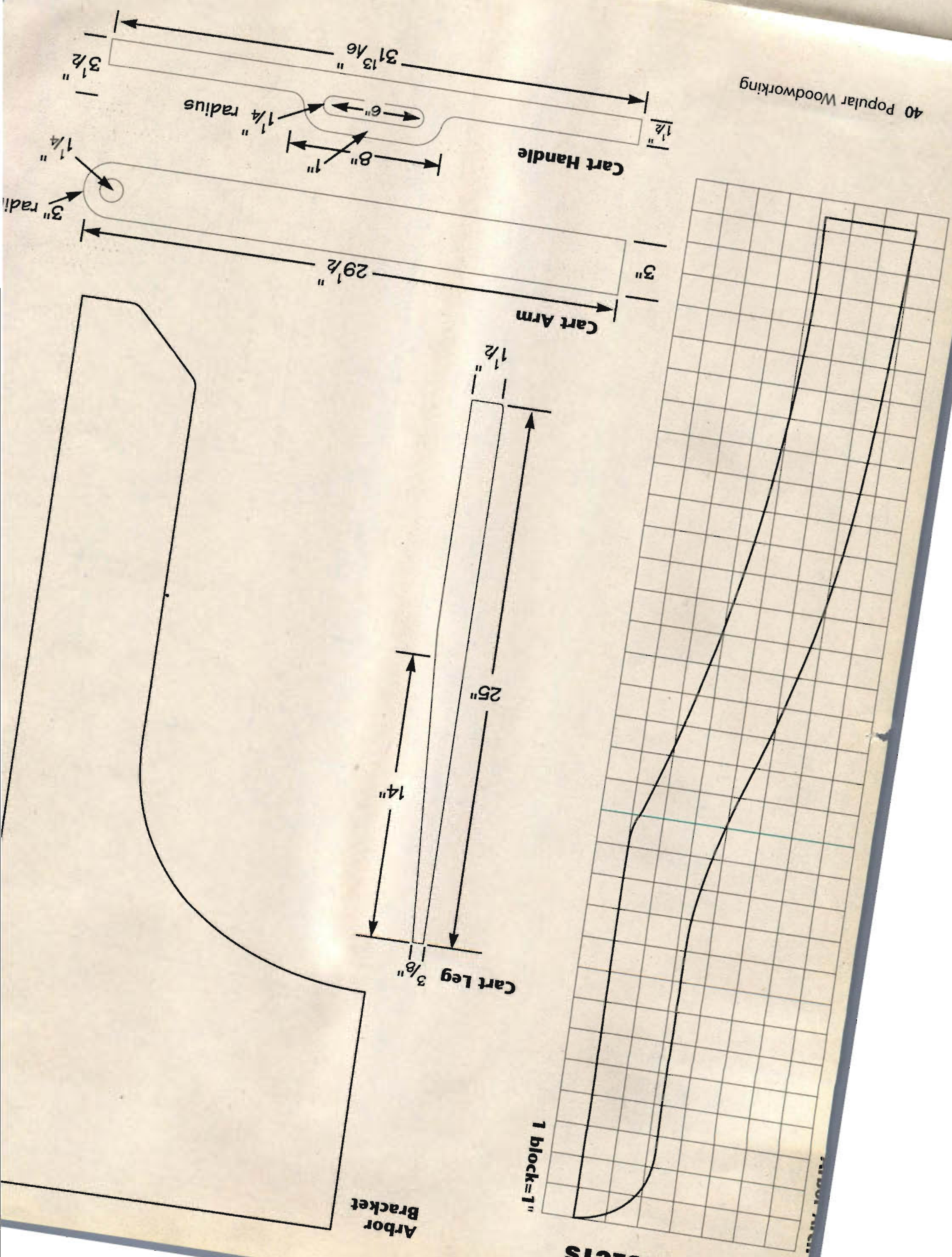
ROCKING HORSE

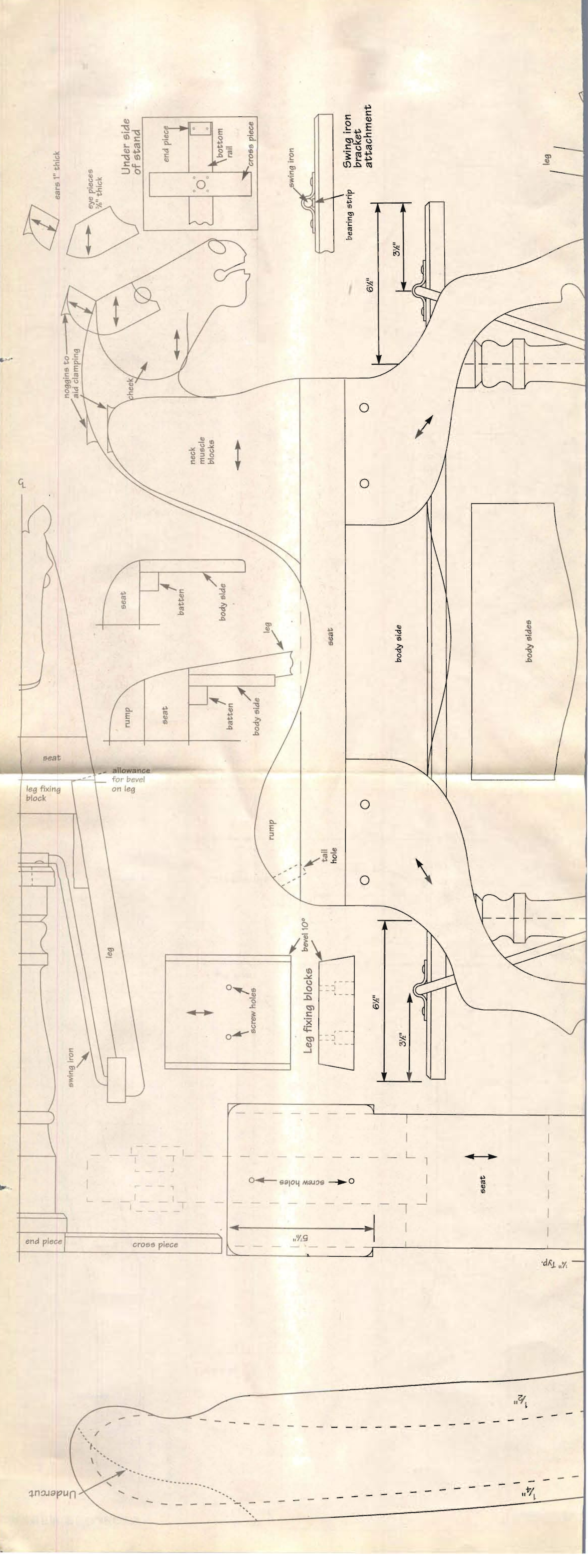
BOOMERANG

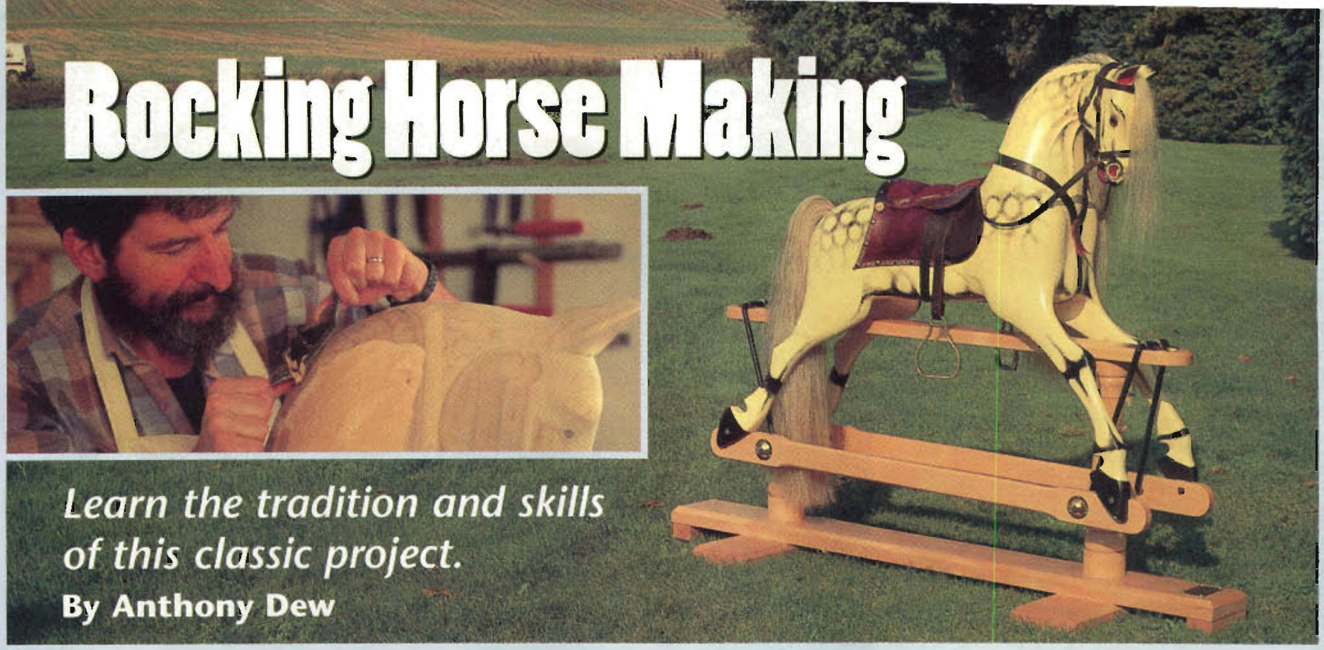


Drawing Is ⅓ Full Size
Enlarge by 300%


las down
2 X 4 Beam Below
Continuous Hinge
23"
25"
2 X 4 Beam Below
37"
41"
4"
5"
18"
3/4"
1 1/2" Wood Pulls Typ.
General storage cabinet
18 3/4"
18"
3" Swivel Casters
25"
Legs slide into support from back of table
This top plate is 3/4" thick x 8" x 15 3/4" long with clipped corners
8"
13 1/4"
From 2x4's
10 1/4"
15 3/4"
Levelers


Cart Handle
31 13/16"
3 1/2"
1/2"
6"
1 1/4" radius
1"
8"
Cart Arm
29 1/2"
3"
3" radi
1/4"
Cart Leg
1 1/2"
25"
14"
3/8"
Arbor Bracket
1 block=1"


ears 1" thick
eye pieces ⅜" thick
Under side of stand
end piece
bottom rail
cross piece
swing iron
bearing strip
Swing iron bracket attachment
leg
6½"
3½"
noggins to aid clamping
cheek
neck muscle blocks
seat
batten
body side
leg
rump
seat
batten
body side
seat
body side
body sides
seat
leg fixing block
allowance for bevel on leg
rump
tail hole
bevel 10°
Leg fixing blocks
screw holes
leg
swing iron
6½"
3½"
screw holes
seat
5⅝"
end piece
cross piece
¼" Typ.
½"
Undercut
¼"



Rocking Horse Making

Learn the tradition and skills of this classic project.

By Anthony Dew

The wooden rocking horse has a long tradition in England, dating back more than 300 years. The early ones were often regarded as ways of training young riders for the saddle rather than as "mere" toys, but they were such fine playthings, and were sometimes so beautifully crafted, that they became very popular.

By the late 19th Century, wooden rocking horses were being produced actively in an extraordinarily wide variety of sizes and styles. They were also made in Germany, where the wooden toy industry was very strong, as well as in the United States, Australia, France, Scandinavia and several other countries.

A rocking horse is a special kind of plaything. It is large and moves, but the movement is quite safe, for the child rider has the horse under complete control and can vary the rock at will from a gentle to and fro to an exciting gallop.

For the woodworker, creating a rocking horse presents an interesting range of challenges. The primary construction involves machining the rough sawn timber, with as many as 20 or more blocks of timber band sawn to shape, then glued and pegged together to form the basic horse shape, which is then carved.

The carving gives the horse its character. Every carver, even starting from the same basic plan, produces a slightly different and individual result, making each hand carved wooden horse unique. Traditionally, rocking horses have a painted finish, typically dapple grey, and here again is scope for the maker's individual approach. Rocking horses are usually tacked up with real leather bridle and saddlery, and may be mounted on either bow rockers or a swing iron safety stand.

Over the years at my place of business, The Rocking Horse Shop, we have developed and made a wide range of sizes and styles of rocking horses. We also undertake restoration work and have learned a great deal about the makers of the past from repairing and restoring their work.

Up to now, more than 20,000 people have made wooden rocking horses using our designs. These plans cater to all levels of woodworking ability, from carved horses to a dollhouse-size miniature horse to a carousel-style horse with carved saddlery.

While some woodworkers sensibly work their way through the range of rocking horse plans, not tackling the larger horses until they've successfully completed the smaller and simpler ones, others go straight for the more ambitious projects. In fact, we often receive letters and photographs from people who've made an excellent horse and surprised themselves — "I have never attempted a project like this before, and wasn't sure I could do it, but just look at this!"

We try to keep the basic construction, woodwork and tool requirements as straightforward as possible. Most woodworkers will have the tools necessary, although the carving does require some specialized tools.

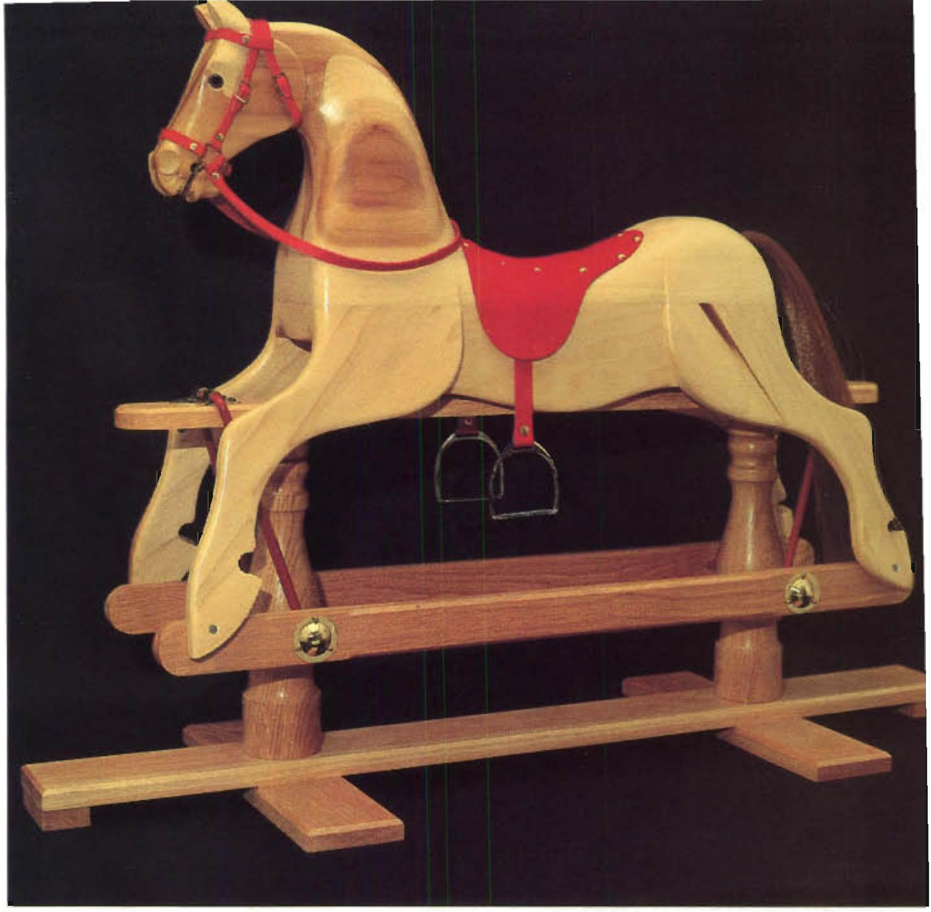
One of our most popular designs is for "The Little Red Rocker." The construction is simple; the appearance enhanced by a carved head, neck and upper body. It's mounted on a swing iron safety stand with its very effective rocking action. (Incidentally, this swing stand mechanism was patented in 1880 by P.J. Marqua of Cincinnati and has never been bettered.)

At our shop, we stock a wide range of specialized rocking horse accessories and fittings, and as many of them as possible are made by us — leather saddles and bridles of various sizes and colors, manes and tails in both real and simulated horsehair, glass eyes, fancy brass nails and rosettes, about a dozen different types of stirrup irons, special brass brackets, and steelwork for mounting the horses — the list goes on and on.

Leather saddles are usually nailed on (with decorative nails) so they're quite secure and cannot slip. Bridles are normally made to buckle on complete with reins, brass buckles and bit rings. Stirrup irons and brackets for mounting the horse on its stand are also often made from solid brass. The idea is to fit the horse out so that it's sturdy and looks attractive and appealing.

Given enthusiasm for the project, a reasonable degree of patience and some basic woodworking skills, anyone can make a rocking horse that he or she can be really proud of. And what's more, it will delight succeeding generations of children, giving them countless hours of quiet pleasure.

Making 'The Little Red Rocker'



The idea behind the design of "The Little Red Rocker" is to combine some of the more appealing elements of a traditional carved rocking horse with a fairly simple method of construction and an effective rocking action. It's a fascinating woodworking project and an excellent plaything, suitable for children up to the age of six or so.

For cutting out and preparing the timber parts, you'll need a small band saw (or saber saw), a smoothing plane, a drill with ½" and ¾" flat bits and several smaller bits for the screw holes, a coping saw, a pair of compasses, and sandpaper. For assembly, you'll need a screwdriver, woodworker's glue, woodfiller and four sliding "F" clamps. The carving requires some specialized tools. Although you could accomplish the carving with fewer, the following six gouges is our recommended starting set for rocking horse carvers: a #2, 5⁄16" straight corner chisel; a #5, 5⁄16" straight gouge; a #9, ⅝" straight gouge; a #4, 1" straight gouge; a #30, ⅜" spoon gouge; and a #8, 1¼" alongee gouge. Round and half-round rasps are very useful for shaping the neck and upper body. Rasps can also be used to round over the corners of the legs, or you can use a router with a rounding over cutter, if you have one.

Timber should be well seasoned (preferably kiln dried) and as free from knots and cracks as possible. Choose a good, close-grained carving timber for the horse. For example, poplar (or tulipwood) carves well and is attractive when given a clear varnished finish. For the stand, choose a hardwood such as oak or ash.

The Schedule of Materials at right gives the actual finished sizes required, after planing. For odd-shaped parts such as the head & neck, two neck muscle blocks, and legs, a reasonable allowance has been made for fitting the patterns economically onto the wood, but for the rest of the parts the length given is the actual finished length required. Note that the two eye pieces and two ears are cut from waste sawn from the head & neck piece, and that the stand posts are sawn for turning. (If you don't have a lathe, they can be planed and left square.)

Use the PullOut™Plans to transfer the shapes of the head & neck, neck muscle blocks, legs, and body sides onto the timber, then band saw them out *(photo 1)*. Leave an allowance of 3⁄16" on the top straight edges of the legs for the 10 degree bevel. The ears and eye pieces are marked out on the waste timber from the head & neck, the ears being sawn to 1" thick, the eye pieces to ⅜" thick.

Now mark the two pieces where the seat narrows in the middle, and remove the waste using a band saw. Then mark the seat, and drill using a countersink to prepare for attaching the neck and rump (see PullOut Plans).

The eye pieces are glued and clamped to the head at either side so that the top edges are flush with the top of the head. When set, remove the clamps, then, with a coarse abrasive, sand flat the top of the head and the bottoms of the ears so they'll sit down neatly. The ears' outside edges are flush with the eye pieces' outside edges *(photo 2)*. Because ears are always vulnerable to knocks, you may want to strengthen these joints with ¼" x 1" dowel pegs. Some carving to the head can now be done prior to fixing it down onto the seat. Study the ***diagram*** and ***photos 3 and 4*** to get a clear idea in your mind of the shapes and curves to aim at. The band sawn head will give you a reasonably horse-like appearance when viewed from the side, but the carving will really enhance the

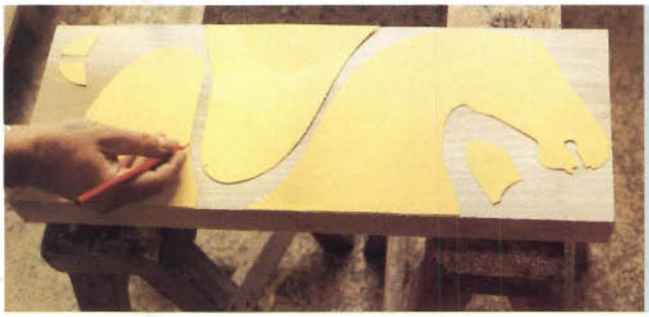
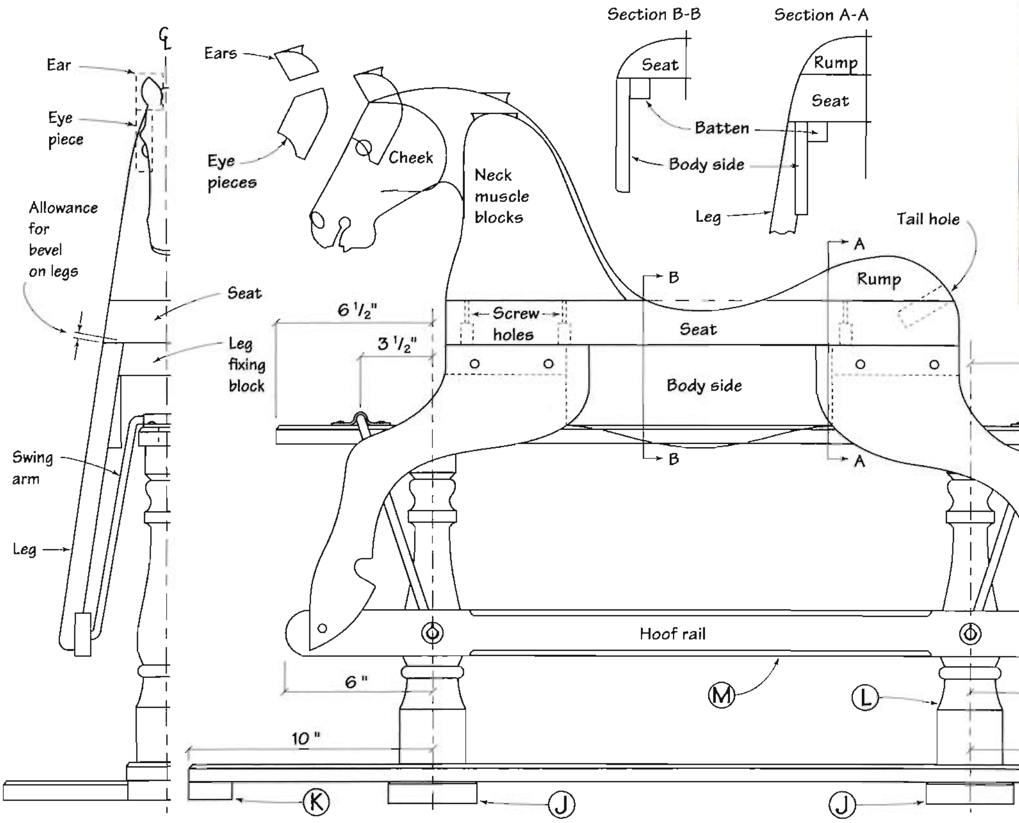
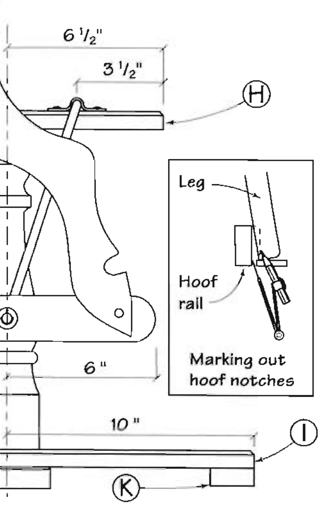


***Photo 1** Lay out the body pieces to maximize material yield.*

Diagram: Front & Side View





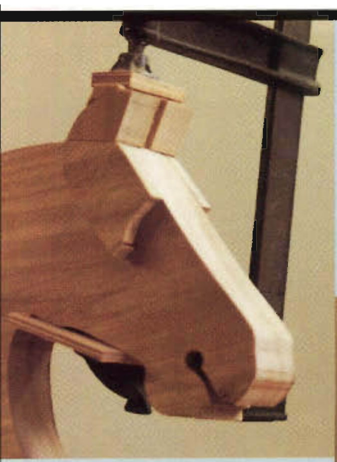
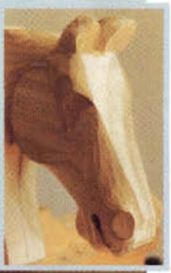
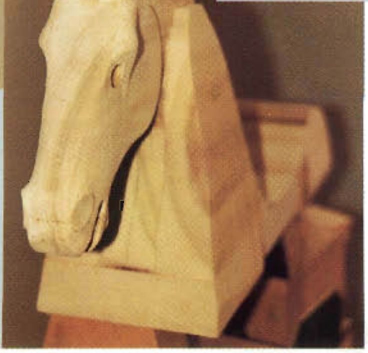


Photo 2 Dowels may be used when attaching the ears to strengthen them.





Photos 3 & 4 These examples show carving details which can be followed to give the best appearance.

Schedule of Materials: "The Little Red Rocker"

No.	Letter	Item	Dimensions T W L
The Horse			
☐ 1	A	Head & neck, plus 2 neck muscle blocks	1¾" x 8¾" x 23"
☐ 1	B	Seat	1¾" x 5¾" x 21"
☐ 1	C	Rump	1¾" x 5¾" x 8"
☐ 2	D	Leg fixing blocks	1⅜" x 4½" x 5"
☐ 1	E	All four legs	⅞" x 6" x 73"
☐ 2	F	Body sides	½" x 4½" x 10⅞"
☐ 2	G	Battens	¾" x ¾" x 10⅞"
The Stand			
☐ 1	H	Top rail	¾" x 2¾" x 35"
☐ 1	I	Bottom rail	¾" x 3¾" x 42"
☐ 2	J	Cross pieces	¾" x 3¾" x 16"
☐ 2	K	End Pieces	¾" x 1¾" x 3½"
☐ 2	L	Posts	3" x 3" x 16"
☐ 2	M	Hoof rails	¾" x 1¾" x 34"

look by getting rid of all those "corners," and giving the head a more rounded personality.

Pencil in some guides — a center line to help you to keep the symmetry, the shapes of the ears, the approximate position of the eyes and nostrils, and the curve of the cheek. The waste around the ears can be removed with a coping saw.

Now take a 1" shallow gouge and pare back the wood at an angle where the nostrils will be, and pencil in the nostrils' oval shape. Pare back around the nostrils until they stand proud, then remove the corners up toward the eye, and above the eye, to the base of the ears. The eye piece remains at its full thickness just above the eye (the eyebrow), but is carved back to run smoothly into the surrounding wood. With a straight chisel, cut along the curved line of the cheek, then pare back the wood on the waste (neck) side of this line. Below the cheek, the head tapers toward the mouth, which finishes up about 1⅜" wide. Carefully cut away the mouth to reveal the teeth, and round over the corners at the back of the lower jaw. The trick with the carving is to work steadily, taking a little from each side in turn and standing back from time to time to examine your progress.

Fix the neck down centrally onto the seat with glue and screws from underneath. You may need to plane the bottoms of the neck muscle blocks to make them fit neatly onto the seat. Now glue and clamp them into place, one at each side of the neck. The fronts of the neck and neck muscle blocks should be flush with the front of the seat. Glue on the rump, which is not shaped prior to assembly. You may need to clamp the rump, as well as screw it on, to get a good joint.

The next step is shaping the upper body and neck (fixing on the legs will come later). First pencil in the curved side profile of the seat and rump. If your band saw will cut deep enough, you can turn the horse on its side and remove the waste from the rump and seat. If your band saw table will tilt, set it to 10 degrees and band saw down each side, keeping the seat full width (i.e. 5¾") at the bottom. If your band saw is unable to cope with these deep cuts, you can hand saw off the waste, or carve it away with your biggest gouge and a mallet.

The neck muscle blocks are carved to run smoothly into the neck, which is rounded over at the top. The rump and seat are also rounded over *(photo 5)*. At this stage, do not carve right down to the lower corners of the seat. When you're getting close to the final roughed out shape, leave off carving while you prepare to fix on the legs and body sides. Plane a 10 degree bevel on the sides of the leg fixing blocks and the tops of the legs so that they'll fit neatly together on the seat's underside. Mark and drill the screwholes in the legs and leg fixing blocks *(photo 6)*, then screw them together and onto the seat temporarily (without glue) while you mark for the notches that are to be sawn from the inside of each leg. Glue and screw the battens to the straight (inside) edges of the body sides *(photo 7)* and place on the seat's underside, between the leg fixing blocks and against the legs. Now, with a pair of compasses open to ⅝", mark for the notches. Study the ***diagram*** to see how these notches should be cut — they enable the body sides to be fitted at right angles to the seat's underside and flush with the edges of the seat in the middle (where it's narrower).

The corners of the legs and lower edges of the body sides are rounded over. This can most easily be accomplished with a rounding over cutter in a router before reassembling the horse. Take care not to round over that part of the leg which will be against the leg fixing block or body side, or the bottoms of the hooves. If you do not have a router, this rounding over can be done with a rasp and sandpaper after assembly. Now glue and screw the legs and body sides into position.

To prevent the body sides from being crushed in when you put the horse in your vice, tuck pieces of scrap wood in firmly between them.

Now the carving can be completed. A shallow gouge and rasp are useful to complete shaping the neck, seat and rump, which should run smoothly around to the legs and body sides *(photos 8 & 9)*. The most common error made by new carvers is to fail to carve away enough timber, leaving the horse looking rather square, so aim to get nice, pleasing curves over the rump and up the neck. It also helps to have the bridle on hand to fit on the head — there's plenty of adjustment on the bridle buckles, so if it's tight you probably need to carve off more. Round

***Photo 5** A large rasp is used to shape the rump of the horse.*

***Photo 6** The leg fixing blocks are attached, then the legs are notched to match.*

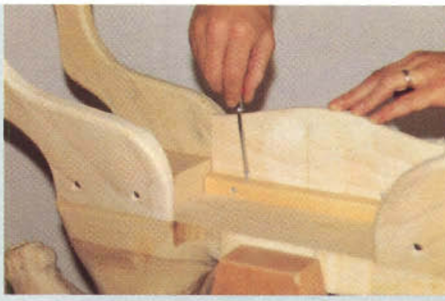


***Photo 7** The battens for the body sides are glued and screwed in place.*

SOURCES OF SUPPLY

The Rocking Horse Shop can supply many full-size plans (with instructions and photographs) and accessories to help you to make a rocking horse.

The Little Red Rocker's accessory set contains a red leather bridle with brass buckles and a bit; a simple padded leather saddle complete with stirrups and stirrup straps; a simulated horsehair tail (in brown, black, cream or pure white); a pair of glass eyes; a packet of brass dome head nails for fixing the saddle; a pair of steel swing irons (including washers and cotter pins); a pair of solid brass swing iron brackets (including steel bearing strips, bolts and screws, etc.); and four solid brass bowler hats (including brass screws).

For more information or a catalog, contact ***The Rocking Horse Shop*** at Dept. PW, Fangfoss, York, YO4 5QH, England (Telephone 01144 1759 368737).

The following companies also keep a stock of some of The Rocking Horse Shop's plans and accessories:

Carousel Memories
P.O. Box 33225
Los Gatos, CA 95031
(408) 356-2306

Gordon's Wood Crafts
P.O. Box 346
St. Clements, Ontario
NOB 2MO, Canada
(519) 699-4786

ED. — In the May 1994 issue of Popular Woodworking, *a mention of the Rocking Horse Shop of St. Jacobs, Canada, was made. This shop is no longer in business. However, Gordon's Wood Crafts of St. Clements, Canada, is authorized to retail The Rocking Horse Shop of England's plans and accessories in Canada.*

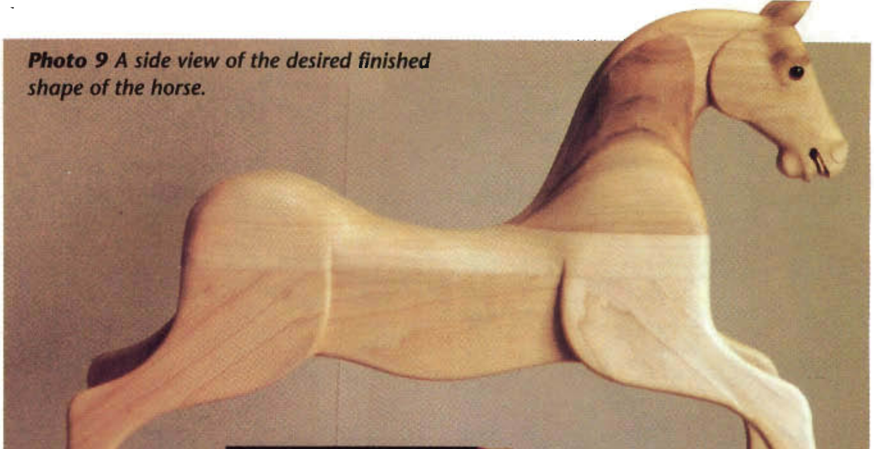


Photo 9 *A side view of the desired finished shape of the horse.*

the corners of the legs so they run smoothly into the neck and rump. Plug the screw holes in the legs and drill a ¾" hole for the tail. Finally, sand smooth all over, using progressively finer abrasives until you have a clean and blemish-free surface.

The head is completed by fitting glass eyes — these really give it character. Cut round recesses slightly bigger than the eye's diameter (⅝") and about ⅛" deep. Set the eyes into the recesses with woodfiller, which is then smoothed all round. The hooves are notched to fit over the hoof rails on the stand ***(see diagram inset)***. Place the horse on a flat surface and tuck a ¼" thick piece of scrap wood under each hoof. If the horse stands unevenly, place more scraps of wood under the hooves until it stands upright without wobbling. Place the hoof rails against the insides of the legs, and with a pencil and a pair of compasses open to ⅜", mark for the hoof notches which can then be sawn out.

The horse can now be varnished — two or three coats of a clear satin varnish will look good, sanding down lightly between coats. When dry, you can proceed with the tacking up.

A pair of stirrup irons riveted onto a length of leather strap is laid over the horse's back and nailed firmly in the middle. The saddle is made from red leather with a foam rubber padding and should be dampened with a little water to make it more receptive to being pressed over the contours of the horse's back ***(photo 10)***. It is fixed in place with brass headed nails spaced evenly along the crease lines and around the back. The tail is glued into its hole and secured with a small wooden wedge tapped in underneath ***(photo 11)***. The bridle is supplied with small brass buckles, bit and reins, so simply buckles onto the head. Now the horse is complete.

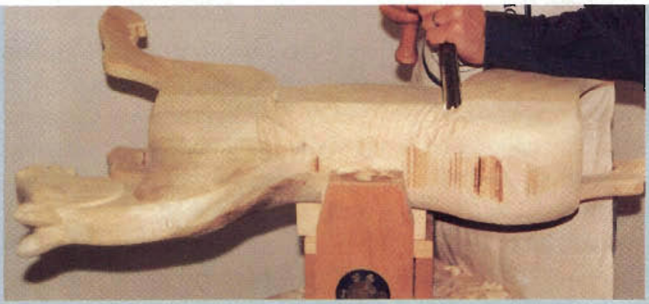


Photo 8 *A shallow gouge makes final shaping of the horse progress quickly.*

Photo 10

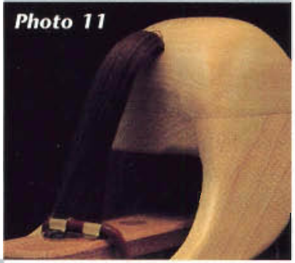


Photo 11

Next you can make the stand. First prepare the stand timber as per the Schedule of Materials, then mark and drill the post holes (1" diameter) and the screwholes. The top edges of the top rail, bottom rail and cross pieces are chamfered at 45 degrees. The stand posts are 13" long between the rails. They're usually turned (see pattern in the PullOut Plans) with a 1" diameter peg or spigot top and bottom which is glued and wedged into the holes through the top rail, bottom rail and cross pieces.

Ensure that the wedges are placed at right angles to the direction of the grain of the surrounding timber. Saw off any projecting pegs and wedges and sand smooth. If you don't have a lathe, the posts can be left square or tapered (which looks better), and in this case it will be easier to cut a square tenon on the ends of the posts. Drill ⅜" holes in the hoof rails for the lower ends of the swing irons to pass through. You may need to enlarge these holes slightly to allow them to pivot freely, but it isn't necessary to fit bushes.

The rails and stand can now be varnished. The ⅜" diameter steel swing irons may need to be adjusted to suit the distance apart of the hooves, and can then be primed and painted. Two steel bearing strips are screwed onto the stand top rail in the positions shown on the plan. The steel swing irons are then placed on them. Add a dab of grease, then screw and bolt on the brass brackets. Push the lower ends of the swing irons through the holes in the hoof rails and secure with washers and cotter pins. Four brass "bowler hats" are screwed on over the lower ends of the swing irons to finish the job off neatly. Lift the horse onto the hoof rails and secure at each hoof with a 1¼" screw.

Now the horse is finished and ready to meet its first rider. I hope that this is not only a fascinating woodworking project for you to make, but will also give many hours of pleasure to its young riders — and will last for years! **PW**

Anthony Dew operates The Rocking Horse Shop in York, England. He is a noted authority on the subject of rocking horses and the author of Making Rocking Horses *and* The Rocking Horse Maker.

Further Information:

History:	*The Rocking Horse* by Patricia Mullins, ©1992 *Rocking Horses* by Marguerite Fawdry, ©1986
Making:	*The Rocking Horse Maker* by Anthony Dew, ©1993
Restoration:	*Restoring Rocking Horses* by Clive Green & Anthony Dew, ©1992

Where Does Your Garden Grow?

Four redwood projects to help your greenery reach for the sky.

By David Thiel

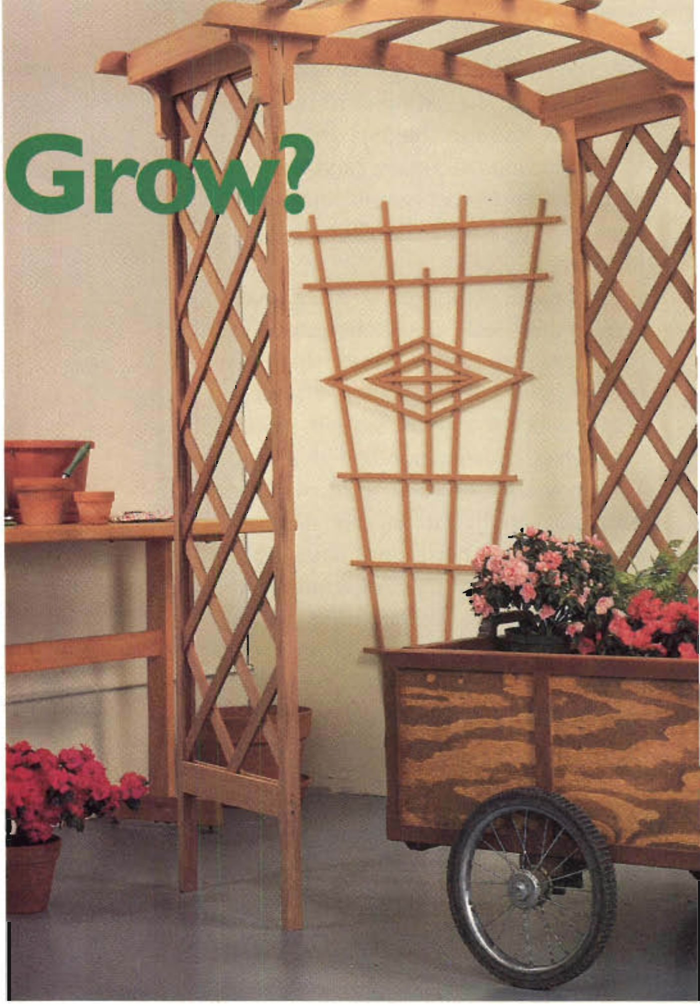


PHOTO: RON FORTH PHOTOGRAPHY

I'm the first person to admit that if I *ever* develop a green thumb, it will probably be gangrene. So when it comes to summer gardening, my wife only counts on me for cutting the lawn. But now I've found another, more enjoyable, way to contribute. During a recent (and reluctant) trip to the gardening store, my wife started pricing a couple of trellises for the side yard. My woodworking pride was roused and my wallet was weeping, so I promised I could do better for less money.

After pouring through a bunch of gardening catalogs, I had my outdoor projects in mind and headed for the local lumberyard. I opted for redwood for a couple of reasons. It's very resistant to rot, looks good new or weathered, and is remarkably strong for its light weight. Oh yeah, and it's easily available as a dimensional architectural lumber in conventional sizes. As for price, I ended up paying about $12 for an 8' two-by-four, so it's about three times the price of treated pine. Your choice.

The Arbor

I started with the sides, using my table saw to cut a ¾" wide x ¾" deep groove on one edge of the frame rails and stiles. I stopped the groove on the stiles 10½" from one end of the stiles, while I ran the groove all the way through on the rails.

I mocked up a frame with an interior measure of 22½" x 67½", the size of the finished slat assembly. I then cut 45 degree angles on the ends of all the slats (double checking the lengths of the slats to make sure no adjustment was necessary) and started laying out the pattern using four ¾" x 6⅜" x 6⅜"blocks as spacers *(photo 1)*.

I glued the slat section together as shown with cyanoacrylate glue (Super Glue) before installing it into the frame. I used glue rather than nails to avoid rust stains due to weather.

Once I used the solvent to "unstick" my fingers and the two slat sections were complete (I ended up trimming a little off the bottom slats), I glued and screwed two frame rails to one of the frame stiles using weather-proof glue (Titebond II®) and weather-proof screws (stainless steel decking screws). Redwood is brittle enough that it splits fairly easily, so I ended up using pilot holes anywhere I placed a screw. I test-fit the slat assembly to make sure it slid in snug, but not forced. Then I used a weather-proof panel adhesive ***(photo 2)*** in the groove to hold the slats in place. Next I attached the second frame stile.

The first step on the roof section was to shape the two horizontal arches. A partial pattern is provided in the PullOut™ Plans, but the pattern is only for the ends of the header, so you'll need to complete the center by connecting the two ends at the proper length.

Using the band saw, I cut one complete arch, then used it to mark and cut the second one. Next I clamped the two roughed-out arches together and sanded the shapes smooth.

To attach the sides to the roof, I used a U-shaped bracket

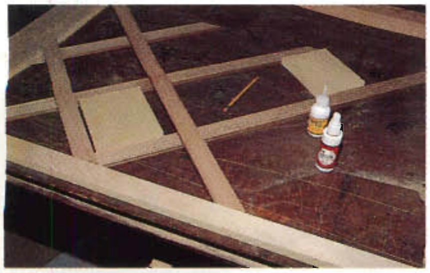


***Photo 1** The slat section is glued together using a temporary frame and blocks to determine spacing.*

***Photo 2** A dab of paneling adhesive is used at every location where the slats enter the groove in the frame.*

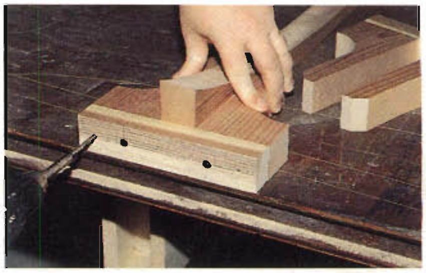
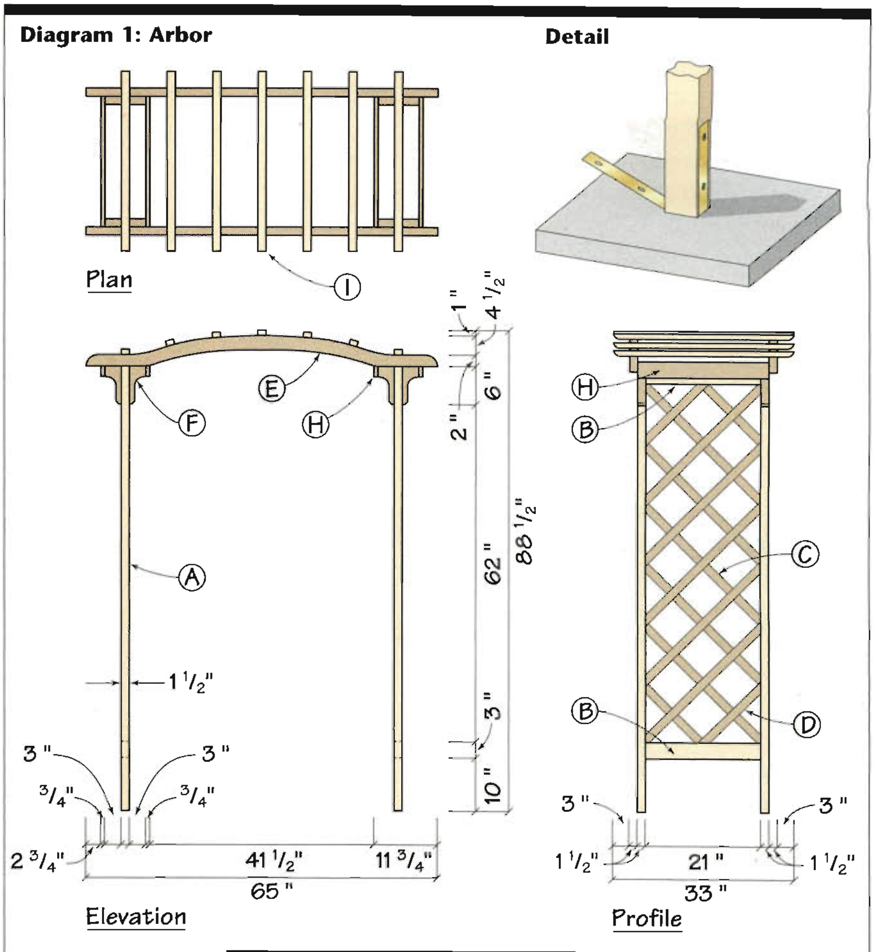


***Photo 3** The U-shaped brackets are glued and screwed together using a frame stile to determine the proper spacing.*



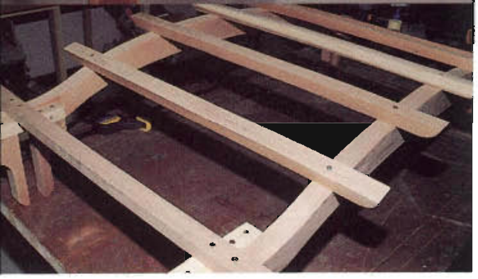


***Photo 4** The ribs provide stability and a design element to the roof section.*

Schedule of Materials: Redwood Arbor

No.	Letter	Item	Dimensions T W L
Arbor			
☐ 4	A	Frame stiles	1½" x 1½" x 82"
☐ 4	B	Frame rails	1½" x 3" x 21"
☐ 20	C	Slats	⅜" x 1½" x 32"
☐ 8	D	Slats	⅜" x 1½" x 17"
☐ 2	E	Arches	1½" x 6¼" x 65"
☐ 8	F	Brackets	1½" x 3" x 7"
☐ 4	G	Bracket tops	1" x 1½" x 7½"
☐ 4	H	Bracket caps	¾" x 3" x 24"
☐ 7	I	Ribs	1" x 1½" x 33"

assembly. A pattern for the eight brackets is included in the PullOut Plans. The brackets were glued and screwed to the bracket tops using four screws per bracket, as shown in ***photo 3.***

The brackets were then attached to the inside of the arches with the inside edge of the bracket 11" from the end, and the top of the bracket 2" up from the bottom of the arch.

The roof section was assembled by first marking the location of the ribs while the arches were clamped face-to-face and flush. The outside ribs were located directly over the gap in the brackets for the sides. I then determined the center of the arches and marked the location of the center rib. The other four ribs were then evenly spaced, two per side, between the outer ribs and the center one. Before attaching the ribs, I used my disc sander to form a 1" radius profile on the end of each rib.

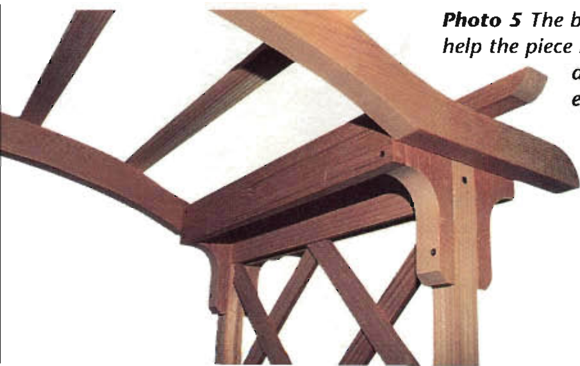


***Photo 5** The bracket caps help the piece look finished and add extra strength.*

The outer ribs were attached using two screws to help square up the roof assembly. The first screw is put in the edge of the arch, and the second into the top of the bracket. With the outer ribs attached, the other ribs go on quickly ***(photo 4).***

To further support the structure (and make the piece a little more attractive), I attached bracket caps ***(photo 5)*** across the inner span of the brackets.

And that's it. I was ready to slip the sides into the brackets. This job can be done by one person, but it's a lot easier with a little help from a friend. The structure can be tied together by simply driving deck screws through the brackets into the frame stiles.

To place the arbor sturdily in your yard, you have a couple of options. A metal stake can be fastened to the legs and then pushed into the ground, or you can purchase paving stones and attach brass straps, as shown in the detail of ***diagram 1.***

The Fan Trellis

This trellis' design uses the strength of the redwood to its advantage. The ⅜" x ¾" dimensions of the vertical strips were determined by testing the wood's flexibility. If you're using another kind of wood, you'll want to check its flexibility because you may need to adjust the thickness of these pieces to achieve the same bending.

I first cut all the vertical strips at 94", trimming them to finished length later. With the seven pieces side by side, ⅜" face up, I marked the spacing for the 1" x 2" spacers as shown in ***diagram 2.*** Once the locations are marked, the spacer blocks are glued into place for the three lower cross braces, again using waterproof glue, and clamping across the width *(photo 6).*

When the glue dried, I put a 2" deck screw through the side of the trellis about 35" up from the bottom. The glue *should* hold, but when the stress of flexing the pieces reaches this point, it's better to have a little extra insurance.

Next I glued and pinned the two 8¾" cross braces behind the upper and lower spacer blocks for extra support.

Diagram 2: Fan Trellis

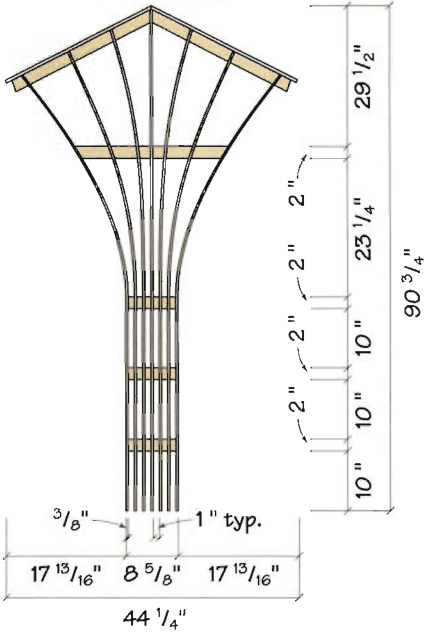


Diagram 4: Diamond Trellis

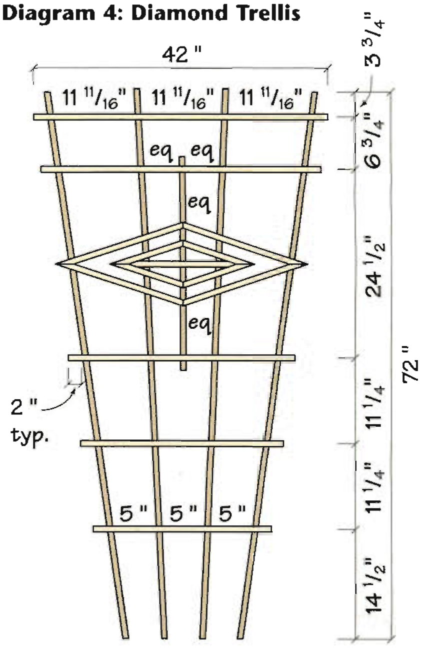
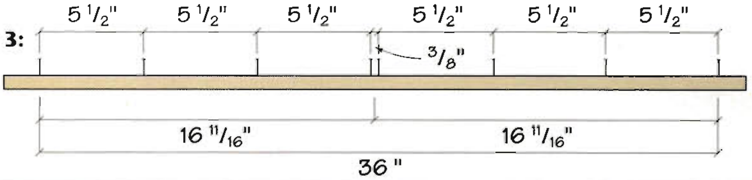


Diagram 3: Fan Jig



I then fashioned a simple spacing jig out of a piece of scrap and some nails ***(diagram 3).*** By placing the tops of the vertical strips to the outside of the nails (or between, in the case of the center support), I was then able to push the jig toward the bottom of the trellis and form an equally spaced fan shape *(photo 7).* My fan ended up 40½" wide at the 76½" height.

I checked the jig for squareness against the center strip, then slid one of the 24" cross braces under the strips at 60" up from the bottom of the trellis. I then marked the location of the strips on the cross brace to show how the brace needs to be cut so the individual blocks will fit between the strips. Don't worry about the slight arch of the line, a straight edge won't make that much difference.

I cut the blocks apart on the band saw, then used the disc sander to make the blocks match the marks. If you don't have a disc sander, you may want to make your cuts a lot closer to the lines.

Rather than clamp, I glued and pinned the blocks to the other 24" cross brace (slipped behind) and to the vertical strips one at a time. By starting from the center and working out to either side you'll be able to keep a tight fit, and end up with a bit of the rear cross brace on either side to cut off.

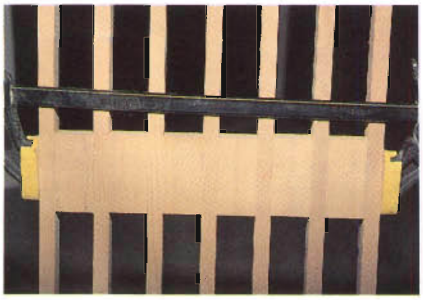


Photo 6 *The spacer blocks are glued into place forming the cross brace.*

Next I used a straight edge to mark out the location of the fan's top peak. Again, my trellis ended up with the center strip at 90" tall and the fan's width was 40½" at the 76½" height. Once the peak was established, I followed the same steps as used before to attach the peak braces, then cut the strips flush to the top. The last step was to cut the appropriate miter on the two peak caps and attach.

Once a couple of spikes were attached to the bottom of the outer strips, my trellis pushed into the ground easily, but I also secured the top against the wall. Once those plants start growing, the whole thing could turn into a giant sail!

Diamond Trellis

This is the simpler of the two trellises, but no less attractive. To add an extra little touch, I used a ¼" radius profile bit in a router to round over all four edges on all the pieces after they had been cut to length.

I laid out the proper location of the top and bottom cross braces as shown in ***diagram 4.*** With these two cross braces positioned, the rest of the locations followed easily. My redwood had some warp to it, which I was able to correct as the pieces were glued and pinned into place.

Once the cross braces were in place, the decorative diamond pattern *(photo 8)* was attached. I first located and attached the vertical brace, then marked the locations of the inner and outer diamond pieces on the vertical strips and the vertical brace.

The inner and outer diamond pieces had to be fit in place. I again used my trusty

Photo 7 *By using the spacer jig, the cross brace spacers are easily marked.*

Schedule of Materials: Trellises

No.	Letter	Item	Dimensions T W L
Fan Trellis			
☐ 7	J	Vertical strips	⅜" x ¾" x 94"
☐ 2	K	Cross braces	¾" x 2" x 24"
☐ 2	L	Cross braces	¾" x 2" x 8¾"
☐ 18	M	Spacers	¾" x 1" x 2"
☐ 4	N	Peak braces	¾" x 2" x 25"
☐ 2	O	Peak caps	½" x 2½" x 26"
Diamond Trellis			
☐ 4	P	Vertical strips	½" x ¾" x 72"
☐ 1	Q	Cross brace	½" x ¾" x 42"
☐ 1	R	Cross brace	½" x ¾" x 38"
☐ 1	S	Cross brace	½" x ¾" x 28"
☐ 1	T	Cross brace	½" x ¾" x 24"
☐ 1	U	Cross brace	½" x ¾" x 20"
☐ 4	V	Outer diamond	½" x ¾" x 17½"
☐ 4	W	Inner diamond	½" x ¾" x 10"
☐ 1	X	Vertical brace	½" x ¾" x 28"
☐ 1	Y	Horizontal brace	½" x ¾" x 14¾"

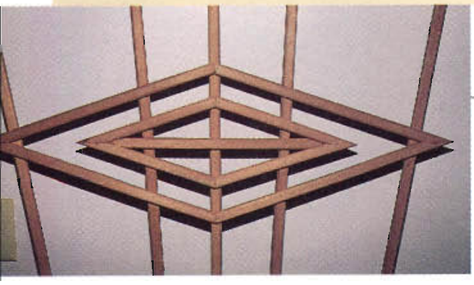


***Photo 8** The trellis' diamond pattern adds a unique touch to the project.*

disc sander, which made quick work of the miters. Once I was happy with the fit, I first glued and pinned the outer points together forming right and left half diamonds, then glued and pinned them to the trellis. The horizontal brace was then fit into place in the inner diamond and attached.

"Woody" Garden Cart

This clever little garden cart started out as an extremely simple project requiring only one sheet of exterior grade (CDX) plywood and some wheels. However, woodworkers being the tinkerers that we are, I couldn't leave well enough alone and ended up adding some redwood trim to class it up. But it's still a simple project.

The box itself is about as easy as it gets. The pieces are cut out of a single ¾" x 4' x 8' sheet of fir plywood. Make sure you cut two 1½" wide x 3½" long notches on the corners of one end of the bottom. It is then glued and screwed between the two sides (using Titebond II™ waterproof glue and stainless steel decking screws). The end is attached to the bottom and sides at the notched end. I ran into a little bit of trouble with the screws bulging the plywood if they weren't centered perfectly (a problem which the plies of the wood seemed to compound), so I eventually started pilot-drilling everything.

In planning the cart, one of the useful features that came to mind was the ability to dump its contents, rather than having to lift or shovel them out over the sides. So on one end of the cart I planned for a panel that would lift out. This "door" is held in place by six pieces of poplar which make up the (for lack of a better description) "sliding door" track. I glued and pinned these pieces in place *(**photo 9**)* with the front pieces flush to the sides. The interior track was placed ⅞" behind the front track to allow room for the panel to move.

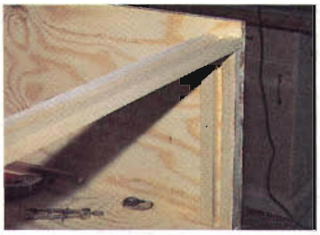


***Photo 9** The sliding door track is formed by attaching strips.*

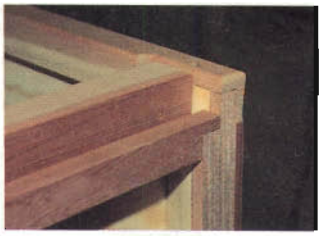


***Photo 10** The redwood cap and trim must be notched to fit.*

Next the panel itself is cut to size. When slipped into the track, the top of the panel extends 1" above the top track pieces. This is where the redwood handle (see PullOut Plans) is attached. Before shaping the handle to match the diagram, cut a groove in the bottom of the piece to slip in the panel. I just used multiple passes on the table saw to make the ¹⁵⁄₁₆" x 1" groove. For added strength, the handle was attached with 1" screws through both sides. Again, pilot-drilling the redwood proved useful.

All the redwood trim was glued and either pinned, or screwed in place according to ***diagram 5***. I started with the two ends, then worked on the sides.

The caps require 1" deep x ¾" wide grooves, and a 3¼" notch on the panel end of the long caps to allow the panel to slip in and out freely *(**photo 10**)*.

The top molding **(N)** has a ¼" x ¾" rabbet the length of the strip, then both ends are notched ½" x 1" to fit against the side. The bottom support **(O)** has a ¾" x 1" rabbet along the length and two 45 degree cuts made on the bottom to keep the squared corners from getting torn up. The two vertical strips **(M)** are then notched and attached as well. With all the strips in place, I used a ¼" roundover bit to soften all the exterior corners of the redwood pieces.

Now the arms are cut and shaped according to the ***diagram*** in the PullOut Plans. I attached them using glue and six screws apiece from the outside. Though this isn't entirely attractive, the arms will need to be fairly strong. I used a 1¼" Forstner bit to make ¾" deep holes in both arms to accept the dowel, which in turn was glued and screwed between the two arms.

The legs are formed from two lengths of two-by-fours, and slipped through the notches made previously in the bottom of the cart. The legs were beveled on the band saw as shown in the PullOut Plans, then rounded over on the bottom. Once in place, the legs are secured *(**photo 11**)*. Be careful not to screw through to the outside of the cart.

The cart is now ready for its wheels. I used 16" spoked wheels from an old high-wheel lawn mower which are available (new) for about $40 a pair through dealers or repair shops. Other types of wheels may also be used. I wouldn't suggest going any smaller than 14" or you'll reduce the cart's ability to maneuver over rough or soft ground. Another suggestion would be 20" BMX-type bicycle tires. Although inexpensive ($25 for a used bike at the Salvation Army), the axles are usually a little under-

Diagram 5: Garden Cart

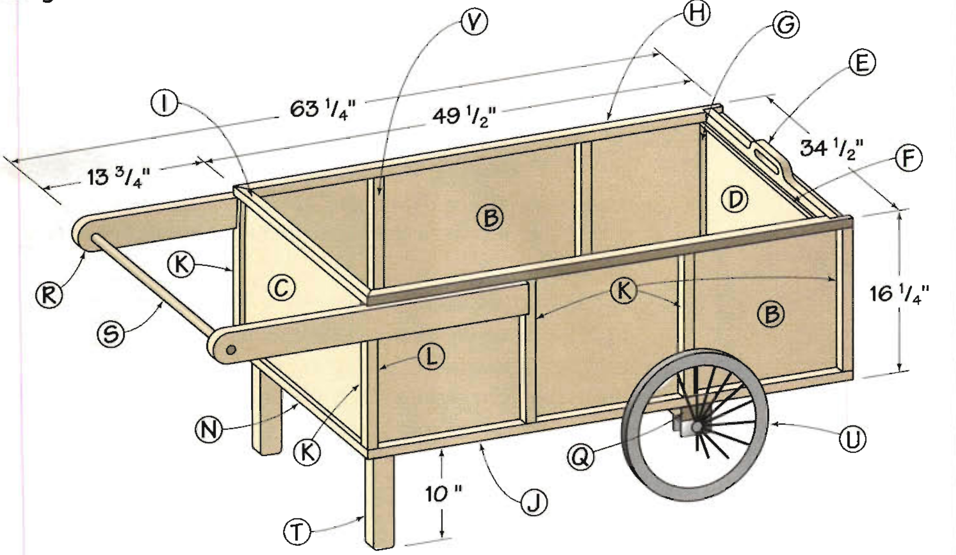


***Photo 11** Secure the legs from the inside of the cart after passing through to notched bottom.*

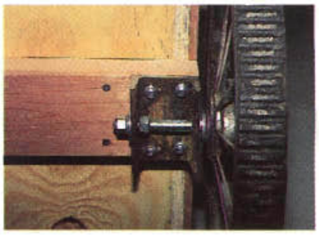


***Photo 12** After the U-channel is attached, fasten the wheels using nuts, bolts and washers.*

Schedule of Materials: Garden Woody

No.	Letter	Item	Dimensions T W L	Material
☐ 1	A	Bottom	¾" x 32" x 48"	Plywood
☐ 2	B	Sides	¾" x 16" x 48"	Plywood
☐ 1	C	End	¾" x 16" x 32½"	Plywood
☐ 1	D	Panel	¾" x 15" x 31⅞"	Plywood
☐ 1	E	Handle	1½" x 3½" x 31 13/16"	Redwood
☐ 2	F	Door tracks	¾" x 1" x 32"	Poplar
☐ 4	G	Door tracks	¾" x 1" x 13⅜"	Poplar
☐ 2	H	Caps	1½" x 1½" x 49½"	Redwood
☐ 1	I	Cap	1½" x 1½" x 34¼"	Redwood
☐ 2	J	Strips	½" x 1½" x 49½"	Redwood
☐ 8	K	Strips	½" x 1½" x 13¼"	Redwood
☐ 2	L	Strips	½" x 1½" x 10¼"	Redwood
☐ 2	M	Strips	½" x 1½" x 15¾"	Redwood
☐ 1	N	Strip	½" x 1½" x 34½"	Redwood
☐ 1	O	Moulding	¾" x 1" x 32"	Redwood
☐ 1	P	Support	1½" x 2" x 30⅜"	Redwood
☐ 1	Q	Wheel Support	1½" x 3½" x 34½"	Redwood
☐ 2	R	Arms	1" x 3" x 29½"	Redwood
☐ 1	S	Dowel	1¼" x 35"	Maple
☐ 2	T	Legs	1½" x 3½" x 25"	Redwood
☐ 2	U	Wheels	16" or larger	

sized, and of two different sizes front and back. You'll also need to worry about matching the threading on the tires. I chose the simplest way.

I cut a section of U-channel steel (fall-off from a local metal working company) into two 3½" lengths. Then I clamped the pieces to a right angle fence on my drill press and bored a ½" hole through the sides of the U-channel to accept the 6" long x ½" bolt I used as an axle for each wheel. I then changed bits and drilled four holes in each piece of channel to bolt it to the two-by-four wheel support *(photo 12)*.

After securing the wheel brackets to the wheel support, I used weather-proof paneling adhesive and screws to attach the support to the underside of the cart 15" on center from the door end. The wheels were then assembled using washers and nuts as pictured in *photo 12*.

As an extra feature, I added a couple of ¾" x 10" x 48" pieces of pine to the sides as "wings" to increase the cart's hauling capacity. The wings were attached by sweating some ½" copper tubing onto a 45 degree elbow to form four angled brackets. I then attached four ½" x 2" x 14½" pieces of baltic birch plywood to the inside of the cart, and used standard copper brackets to form supports for the brackets *(photo 13)*.

Because I'd gone to way too much trouble on this project, I decided to go a little further by staining and then finishing the cart with spar urethane for protection.

***Photo 13** Copper tubing provides support for the optional "wings."*

My garden cart will now comfortably carry 400 pounds of firewood, topsoil, plants — you name it. And when it comes time to put it away for the winter, a friend pointed out that it could be stood on its end and shelves put inside for storage! Okay, maybe not.

Green thumb or no, I participated! I promptly headed to the hammock to enjoy my glass of lemonade and gaze with adoration at my handiwork. But it wasn't too long before I heard my wife calling that I'd better get started on cutting the grass before the light was gone. Oh well, back to work!

David Thiel is associate editor of Popular Woodworking *and is seriously thinking of installing some astroturf so he can get more hammock time.*

SETTING UP SHOP

Here's how to select the tools you need with the money you have, be it $1,000, $2,000, $3,000 or beyond!

By Hugh Foster

Despite the high cost of tools, it *is* possible to set up a good working shop without spending the rest of your life in debt. Before I present how I'd spend my first, second and third thousand dollars, keep in mind that you'll be better off using my ideas as starting points and fine tuning your own list based on your specific interests and needs.

First and foremost, know what kind of projects you want to build and buy the appropriate tools. I believe it's better to start with fewer top quality tools, the best you can afford, and do without others until you can afford the best. Besides, purchasing quality is ultimately better, cheaper and safer than buying second rate. It's also more cost-efficient to buy what you want the first time than to spend more money later on trade-ups.

IT ISN'T EVEN GREAT TOOLS THAT MAKE ONE A FINE WOODWORKER, BUT WHAT ONE DOES WITH THEM.

Working with precision tools should shorten your woodworking learning curve. Fine quality tools are a joy to use. Besides, you're less likely to be injured with first rate tools. (In this same vein, keep your cutting tools sharp, regardless of their price. I suppose I'd rather have sharp, second-quality tools than their dull betters.)

Don't purchase any tool without trying it out. I used to be just interested in "most bang for the buck." Now I just want the best, period. But remember that price isn't the only indicator of quality, and that it isn't great tools that make one a fine woodworker, but what one does with them. It's fair to borrow a tool once; after that, buy it. If you don't need it enough to own it, you don't really need it.

Also consider the advantages of used tools. You'll get better quality equipment than you'd be able to buy new. *If* you know what you want and you're not in a hurry, search garage sales for good, used equipment. Many of my favorite hand tools came from garage sales or the like. Besides garage sales, look for used merchandise in equipment ads in area newspapers; and don't be the last to call. Check out estate sales and the local "shopper" paper; and consider placing a "wanted" ad there. That small investment might work wonders.

Good used tools can be a great bargain, but beware of used-up, pre-owned tools. Don't buy someone else's problems. Know how to inspect your purchases for wear. Whether you're buying new or used, pay attention to the tool's design. Is it simple enough that you'll be able to repair it when it breaks, and are parts available?

Sign up for a woodworking class at your local technical school. You'll meet good people there. The shops will also be well-equipped with a variety of tools that you can sample. "Gossip" there will provide sources of tools and comments about the various brands.

Also visit equipment dealers. Apprise them of the prices advertised in *Popular Woodworking*. Will they offer a discount? What services do they provide to justify their higher price? In my experience, *Popular Woodworking* advertisers are honest and reputable, providing fast delivery of items that can't be bought locally. A word of fairness here: It isn't right to take up your local dealer's time and then place a mail order. If you trust the expertise, buying directly from your dealer is often worth the extra cost.

$1,000

R.J. DeCristoforo's list, "The $1,000 Shop," in the March 1996 issue of *Popular Woodworking* is a great place to begin. He has achieved terrific value with $1,000. By way of review, in that first $1,000 he was able to buy these power tools: a modest table saw, a drill press, a router, a jigsaw, a cordless drill with bits, and a palm sander. He also bought these hand tools: chisels, clamps, a hammer, a tape measure, screwdrivers, a hand plane, a backsaw and an adjustable square.

The goal of allocating a second and third thousand dollars is to expand the shop's capabilities while adding more safety and precision. Since DeCristoforo described *the first* $1,000 so beautifully, I'll begin my discussion with the second thousand.

Ryobi AP-12 Thickness Planer

Makita 3901 Biscuit Joiner

Jorgensen 3712 Bar Clamp

Crown Marking Gauge

$2,000

The first tool I'd add is a Stanley #92 rabbet plane ($65) for trimming joints. You're likely to want tighter joints than you can cut with your table saw or router, so this is a great aid for fitting joints to make them right on the money. Add the rabbet plane to the #60½ block plane which DeCristoforo bought in the first thousand, and you're set for most of the hand planing jobs required in a modern power tool shop.

A marking gauge is an essential layout tool. With one like Crown's (at $32.50), you can accurately lay out mortises as well as single scribe lines. This joins a Veritas hook rule and a marking knife as essential to laying out your projects. Also buy a second square — an all-steel machinists' square provides the most accuracy. Having a pair of squares lets you check one's "squareness" with the other. A marking knife permits more precise layout than a pencil; expect to spend about $11.

You can never have too many clamps. Starting out today, if I couldn't buy used ones in greater quantity, I'd buy six each of Jorgensen 12", #3712, for $37.25 and 18", #3718, for $40.50. I once bought some pinch-dogs, having read that they'd save me from having to buy so many clamps. I've found that they work well in some circumstances. A handful of pinch-dogs will replace at least an armful of clamps. Buy big ones (for $1 to $2 each) in pairs, and use them wisely.

PURCHASING QUALITY IS ULTIMATELY BETTER, CHEAPER AND SAFER THAN BUYING SECOND RATE.

A jointer is probably one of the two essential stationary tools. The longer the bed, the flatter the cuts it will make. The small Ryobi (6⅛", #JP155, for $305) is fine, but you might prefer a jointer with a longer bed. I still wish I'd kept my Sears 6⅛", #23221 ($379 or less) when I upgraded a few years ago. My father-in-law called this "the perfect left-handed jointer." As a left-handed woodworker, I couldn't agree more.

A thickness planer is equally handy; and in my hometown of Manitowoc, WI, the rental rate is more than $25 an hour. While the tool isn't bought until the third thousand, it requires discussion here because it's the perfect companion to a jointer. You'll go a long way to beat the Ryobi AP-10. If you can find one of these out-of-production tools, it should cost about $275. If you need a 12" planer, I suggest the Makita #2012, which has double-edged, replaceable blades for quick, easy and accurate setup, or the Ryobi AP-12. Either will provide quality 12" planing.

Buy a good belt sander. The AEG 3" x 21", #HBSE75S, can be bought for $178, which includes a stand for bench mounting the tool (abrasive side up). Another $100 will get you the finest sanding frame on the market — an excellent aid for truly flat sanding. A sander that can be bench mounted can also be used with fine abrasives for sharpening tools. It's all the sharpening our budget allows until the third thousand.

Today biscuit joiners are more a necessity than a luxury. Careful shopping will get you the Freud #JS102 for about $144 (after rebate) or the Makita #3901 for about $219. Biscuit joining permits accurate, fast, strong joint construction. I can think of no other single tool that will increase your project output as rapidly as a biscuit joiner.

DeCristoforo specified a router for the first $1,000, though I might recommend upgrading to the Bosch B1450 plunge router ($185). Tooling for your router can easily cost another $200, which fits appropriately in this category.

Be sure to get some "hear muffs" — comfortable ones like E.A.R.® #1000 ($11.70) — and wear them whenever power equipment is running. Noise pollution is an underrated problem with all power tools. While you're shopping for safety gear, get a pair of safety glasses or goggles, and then wear them whenever you're running your power equipment.

The book *Tage Frid Teaches Woodworking/Joinery and Shaping* ($29.95 from Taunton Press) rounds out my second thousand. Apart from being as good a woodworking text as I've encountered over the years, it contains the plans for one of the best woodworking benches available, and building that bench may be the best investment in your third thousand.

SPENDING CHART

FIRST $1000	
Adjustable square	$17
Backsaw	$12
Screwdrivers	$30
Tape measure	$10
Hammer	$15
Chisels	$30
Bench plane	$30
Clamps	$14
Table saw	$350
Jigsaw	$80
Palm sander	$40
Plunge router	$180
Drill bits	$20
Cordless drill	$80
Drill press	$115
TOTAL	$1023

SECOND $1000	
Rabbet plane	$65
Engineer's square	$10
Hook rule	$12
Marking-out knife	$11
More clamps	$40
Jointer	$305
Belt sander	$150
Biscuit joiner	$144
Router bits *(possibly incl. joining biscuits & abrasives)*	$200
Hearing protection	$10
Safety glasses	$8
Frid book	$29.95
TOTAL	$984.95

Bosch B1450 Plunge Router

Freud JS102 Biscuit Joiner

Makita 2012 Thickness Planer

Makita BO5001 Random Orbit Sander

THIRD $1000	
Planer	$390
Sharpening system	$115
Water or oil stones	$50
Random orbit sander	$69
Dust collector	$180
Bench	$200
TOTAL	$1004

$3,000

Sharpening systems are really important and hard to recommend (for some ideas, though, see "Tool Talk" in this issue). Before buying, try out other people's until you find one you like. If you can get excellent results with your belt sander, you might prefer to spend this portion of the third thousand on a scroll saw, more clamps, more chisels, or the beginning of a carving tool collection. These days I'm using the Tormek sharpening system, and I'm achieving terrific accuracy and great pleasure, but you could do far worse than to buy a grinder like the Delta #23-880 ($115). Add a white Aluminum oxide wheel and a cloth polishing bonnet, and you have a hot setup. A couple of good oil or water stones will help you hone the tools after you grind them. Honing is what gives you real sharpness.

Now add a random orbit sander to your list. Fast, swirl-free removal of material is provided quite inexpensively by the Porter Cable #333 ($75) or the Makita #BO5001 ($69).

> **I USED TO BE JUST INTERESTED IN "MOST BANG FOR THE BUCK." NOW I JUST WANT THE BEST, PERIOD.**

In the second thousand you bought protection for vision and hearing. In the third thousand, I recommend protection from dust and chips. If you plan to operate a jointer, and especially a planer, you'll make a huge quantity of dust and chips. A collector like the Reliant 1 hp #NN720 ($179.95) is an investment in both neatness and good health.

A good workbench is probably the most important tool in the shop. Commercial models are all very expensive, and if you're left-handed, they're also backwards. Build your own, Frid style (from the book by Tage Frid mentioned earlier in this article), or use the Veritas plan with a double vise at the end. Either will cost about $200. Other early projects should include sawhorses (make four) and a good tool chest. A cheap bench can be made with a used solid core door laminated with tempered masonite. You're sure to want a router table — and a shop-made version can save you at least $100.

For each stationary tool, I suggest making your own base rather than buying the manufacturer's model. This not only saves money, but the wood tables will reduce the noise in your shop, a real bonus.

By shopping carefully, it may be possible to beat the prices listed here. Then again, spending another 10 to 25 percent would be very easy, even if you're buying only necessities.

$4,000 and Beyond

A band saw and some additional hand planes, clamps and accessories will fill out the fourth thousand, though this band saw is part of my only real quibble with the concept of this list. I believe I would've preferred to start with a band saw rather than a table saw in the first thousand. While many woodworkers call the table saw their most important tool, I've omitted it from my starter shop because the major fault of most "home" workshop equipment is that it's underpowered by at least 50 percent. To get a suitably powerful table saw would require investing approximately half of our total spending allowance.

Designer/craftsman James Krenov suggested that he'd rather have a good band saw than any other single saw. I read that years ago with great skepticism, but now that I've seen some good band saws, I agree. Safer than the table saw for ripping and most other kinds of cuts, a powerful and well-tuned band saw can do nearly everything that a table saw can. Buy the deepest-throated, most powerful band saw you can afford, and learn to adjust and operate it well. Either the Delta or Jet 14" model is a good choice. A band saw or jigsaw, combined with a bit of patience and practice, will help you get excellent flat, square results.

We've given the scroll saw a short shrift so far in this article. I've known more woodworkers who've claimed to have more fun with a scroll saw than any other tool. Since a modest scroll saw costs less than $200 (Grizzly G1060 for $150), I suggest you get one. There's sure to be something else in my list that you'll call inessential — after all, this is going to be your shop!

A good lathe for turning or a modest shaper with an assortment of tooling could take up much of the fifth thousand.

Rounding Out Your List

Will $3,000 buy you the ideal shop? Not really, but it will let you make a darn good start! If you're buying the gear all at once, try to bargain for a discount. You'll note that we haven't stopped exactly at the target totals. It's not hard to spend the price of a very fine automobile on your woodworking shop. Then again, I'm confident that the shop will provide you far more pleasure, and longer service, than any automobile ever will.

***Hugh Foster** is a contributing editor for* Popular Woodworking.

Delta 23-880 Bench Grinder

Porter-Cable 333 Random Orbit Sander

Ryobi JP155 Jointer-Planer

Jet 14" Band Saw

Tray Top Wine Server

A mobile wine bar, complete with a lift-off serving tray and quality carpet casters.

By David Thiel

You don't have to be a wine afficionado to enjoy a glass with friends, but this cherry wine server will make you feel (and look) like a connoisseur. This mobile wine bar features special details, including a drawer that's just the right size for storing a corkscrew and napkins, brass racks for your stemware, and a lift-off serving tray.

We decided to use solid cherry and veneered medium-density fiberboard (MDF) for the project. Veneered MDF often gets a bad rap from folks who claim it's "not real wood." Well, it *is* all wood, and in many situations it's better than solid wood. MDF is absolutely stable, has no swelling or shrinkage problems, and the veneer is guaranteed to be without checks, knots or other defects which would detract from the overall appearance. And best of all, it's inexpensive! We purchased a ¾" x 4' x 8' sheet of cherry veneered MDF for about $40, and kept the overall materials cost to about $100.

Production starts with the legs. Rather than buy an entire 8⁄4 cherry board to make just four legs, pay attention to grain and color, and glue-up 4/4 stock to make the legs a little oversize (1⅝" x 1⅝" x 32"). The extra dimension compensates for any slippage during gluing *(photo 1)*.

Glue all the legs at the same time, which allows you to compensate for any bowing in the pieces. If they're bowed, glue them with the concave surfaces facing one another.

When they're dry, scrape any excess glue and head for the jointer. Square one corner by placing the glue seam edge down on the table *(photo 2)*. Repeat this for all the legs, then use your planer to run them down to 1½" square.

Cut the legs to finished length by first trimming one end, then marking the overall length on the opposite end and cutting.

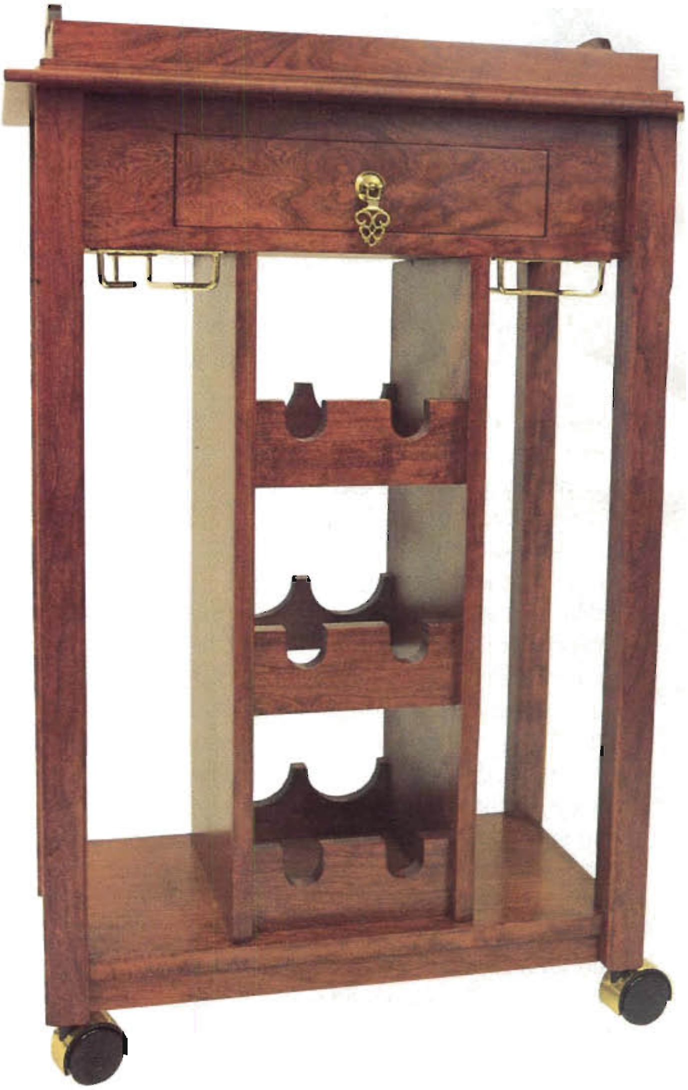
To add visual interest to the legs, run a ¼" cove detail on each of the three outside corners. Start it 6" down from the top and run the detail through the length of the leg *(photo 3)*. Use a table-mounted router, and mark the start/stop spot on the fence before turning on the tool.

Next cut all the MDF pieces, starting with the largest ones and working to the smallest.

To cover the MDF edge, glue ½"-thick x ⅞"-wide solid cherry to the panel edges *(photo 4)*. The ⅞" width allows for a slight overhang on both sides during glue-up. When milling these solid wood edges, take a jointer pass off the board after each cut. This will ensure the glued edge makes a perfect joint. Then adjust your cutting list to accommodate this edging.

After the pieces are glued to the MDF, the overhang can be hand planed close to flush *(photo 5)*. Then sand flush using a random orbit sander, and cut the ends flush with a backed saw or Japanese saw.

When edging the server's bottom, leave the edging short at the corners, since 1" notches will be cut there *(photo 6)*. You



Schedule of Materials: Cherry Wine Cart

No.	Letter	Item	Dimensions T W L
☐ 4	A	Legs	1½" x 1½" x 31¼"
☐ 2	B	Partitions	¾" x 10¼" x 24¼"
☐ 1	C	Cart bottom	¾" x 11" x 21"
☐ 2	D	End aprons	¾" x 5" x 9"
☐ 1	E	Back apron	¾" x 5" x 19"
☐ 1	F	Front apron	¾" x 5½" x 19½"
☐ 2	G	End kicks	¾" x 1¼" x 9"
☐ 2	H	Front/back kicks	¾" x 1¼" x 19"
☐ 6	I	Bottle supports	¾" x 3" x 7½"
☐ 1	J	Drawer section bottom	¾" x 9" x 19"
☐ 2	K	Drawer partitions	¾" x 3" x 9"

Photo 1 *Clamping all the rough-cut legs together during gluing can defeat some of the bow that is found in your material.*

Photo 2 *Square the legs on the jointer by running the glue edge against the table. Make sure you scrape any excess glue before running or you can damage high-speed steel knives.*

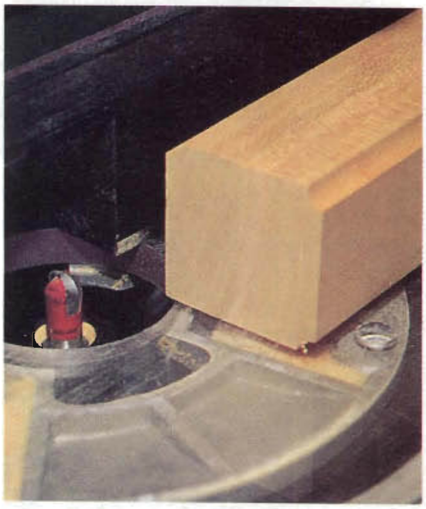
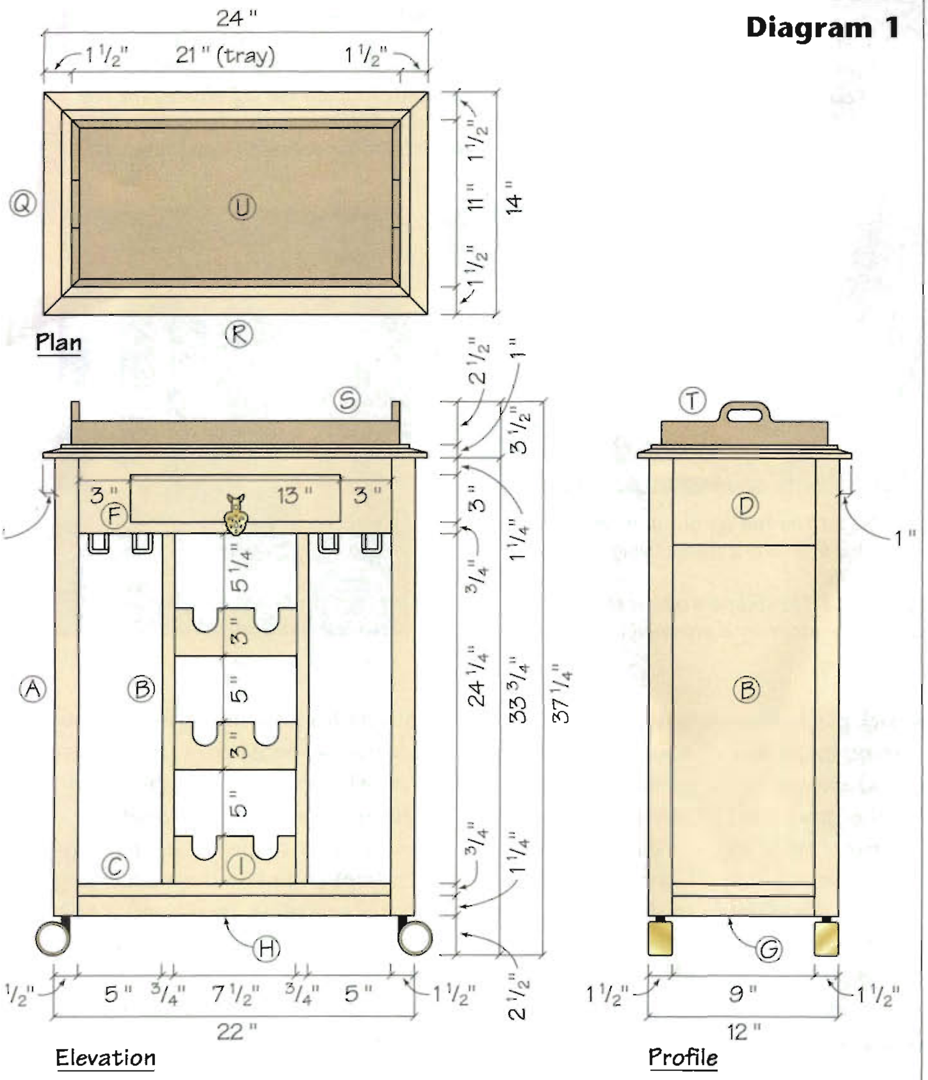


Photo 3 *The cove bit used in a router table provides a simple but attractive detail on the legs.*

Diagram 1



✎ No.	Letter	Item	Dimensions T W L
☐ 4	L	Partition cleats	½" x 1¼" x 8"
☐ 2	M	Drawer sides	½" x 3" x 8½"
☐ 2	N	Drawer ends	½" x 2¹³⁄₁₆" x 11¹¹⁄₁₆"
☐ 1	O	Drawer bottom	½" x 7¹⁵⁄₁₆" x 12⅛"
☐ 1	P	Top	¾" x 11" x 18"
☐ 2	Q	Top edges/end	1" x 1½" x 14"
☐ 2	R	Top edges/front/back	1" x 1½" x 24"
☐ 2	S	Tray sides	½" x 1½" x 21"
☐ 2	T	Tray ends	½" x 2¾" x 11¾"
☐ 1	U	Tray bottom	¼" x 10⅜" x 20⅜"

Photo 4 *By clamping solid cherry edging to the particle board, the look of solid cherry furniture can be achieved at bargain rates.*

Photo 5 *When planing the solid edges flush to the veneered particle board, be careful to keep the plane iron level to the surface. It only takes a simple slip to gouge the veneer.*

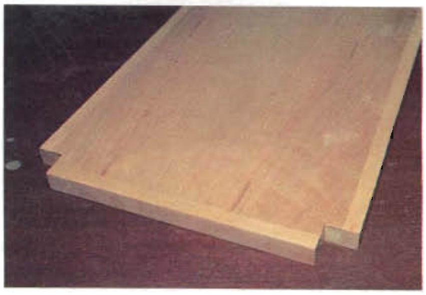


Photo 6 *The corners on the bottom are notched at 1" to allow it to fit between the legs.*

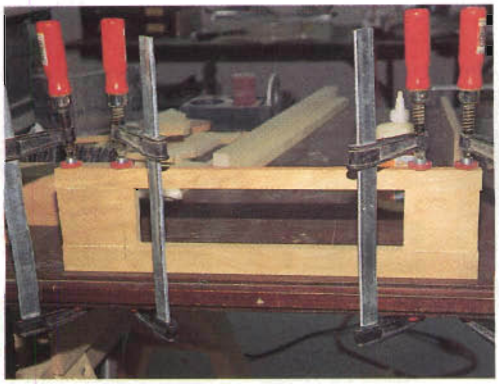


Photo 7 *Gluing the front apron together again after the drawer front has been cut out makes a very attractive finished appearance.*

Photo 8 *Using a doweling jig allows the dowel to be centered exactly. This reduces the chance of splitting in the particle board material.*

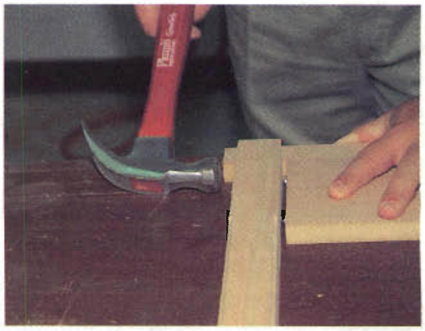


Photo 9 *The doweling centers (the metal pieces between the apron and leg) are placed in the dowel pockets in the apron. By lightly tapping the leg against the centers, a visible indentation is made to guide the drill for the opposing dowel pockets.*

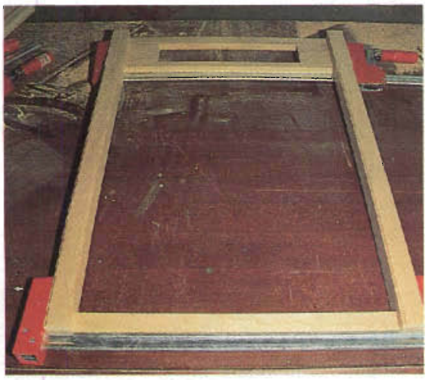


Photo 11 *After the dowels are ready, the front and back frames can be assembled.*

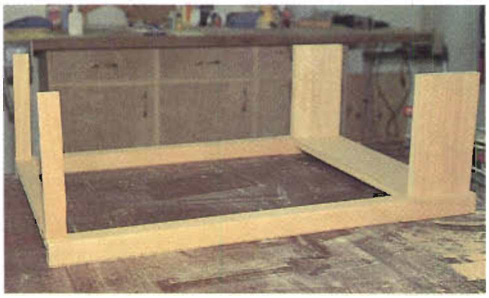


Photo 12 *The end aprons and kick pieces are doweled first to one frame, lying flat.*

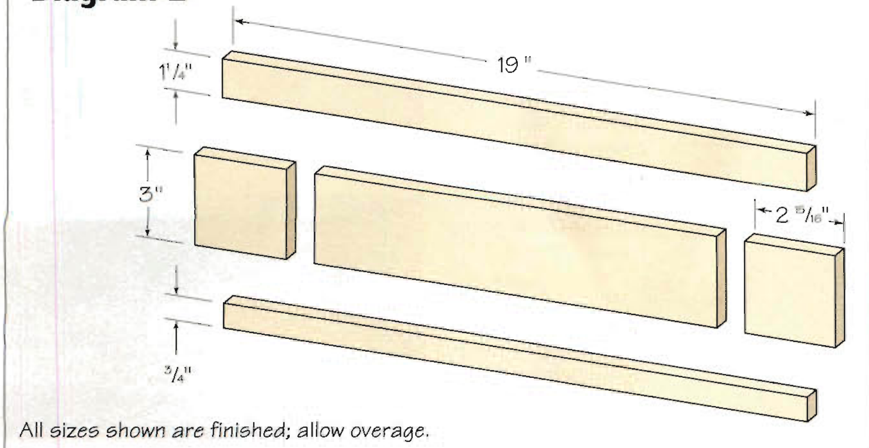
Photo 13 *The second frame is then attached and the entire assembly is clamped until dry.*

may be tempted (as we were) to cut the 1¼" kick pieces from MDF as well, but when drilling the parts for joining to the legs the MDF splits very easily. Use solid cherry to avoid a headache.

Once all the MDF pieces are cut, move to the other solid cherry pieces. Note that the front apron is oversized by ½" in both directions. ***Diagram 2*** shows how the drawer front is cut from this piece to keep the grain match. The extra ½" on the Schedule of Materials allows for saw-kerfs and spacing.

After the cuts are made, lay the frame on a flat surface and fit the drawer front into its opening. It may be necessary to take a jointer pass off the drawer front's long edges to allow adequate clearance. Then slide the two ends in toward the front until the space is even (1/16" full) all the way around the drawer. Mark the placement, then glue the front together ***(photo 7)***.

Diagram 2



All sizes shown are finished; allow overage.

The six bottle rest pieces are also made of solid cherry. Choose the best grain for the front and mark these according to ***diagram 3***. Start the "U"-shaped cutout by making a hole using a 1½" Forstner bit, then cut on a line starting at the top edge until reaching the hole's side.

Make the three rear supports according to ***diagram 4***. Once all the pieces are cut out, sand the inside surfaces to 150 grit. If this isn't done now it will be a real knuckle buster later and won't produce a very satisfactory job.

Next take the four apron pieces and kick pieces and use a doweling jig to drill holes for dowels to attach the pieces to the legs. Use two dowels per end in the aprons and one dowel per end in the kicks.

Drill the dowel holes in the aprons and kicks ***(photo 8)***, then use a set of dowel centers to transfer the proper positions to the legs ***(photo 9)***. Both the aprons and kicks are flush to the inside corner of the legs. The aprons are held flush to the top of the legs, while the kicks are held flush to the bottoms.

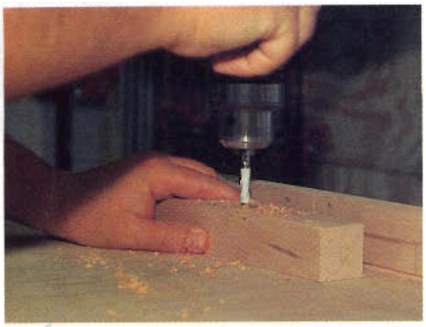


***Photo 10** A piece of tape on the drill bit is used to indicate the appropriate depth. Of course, you could set the depth adjustment on the drill press, but that takes all the fun out of it!*

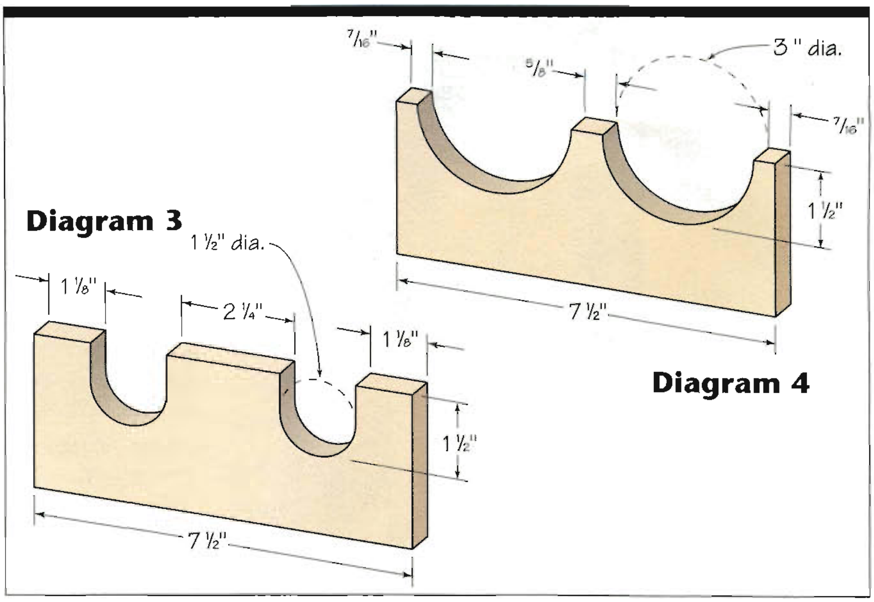


Diagram 3

Diagram 4

***Photo 14** If you have the clamps to do it, the bottom and inside bottom can be glued into place while the frame is drying.*

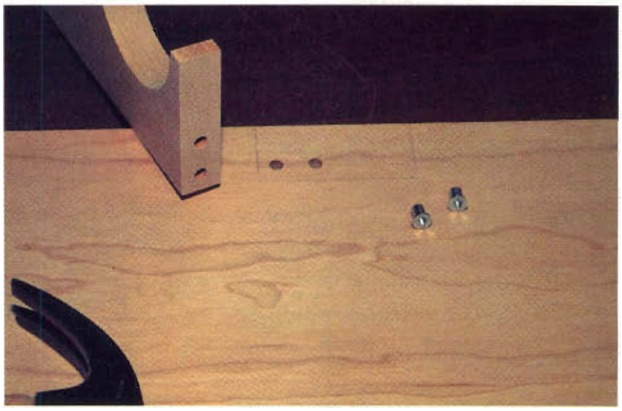


***Photo 15** A back bottle support is shown with the doweling centers used to locate the pocket position in the partition.*

Once the leg dowel holes are located, chuck the bit into a drill press and mark the bit with tape to determine the necessary depth, then drill *(photo 10)*.

The next step is to glue-up the front and rear frames *(photo 11)*. Pay attention to the orientation of the kick pieces, because with only one dowel they might rotate out of alignment. Once dry, apply glue to the end dowel holes and attach the end pieces to one frame *(photo 12)*. Repeat with the other frame *(photo 13)* and clamp. Check for square and make sure the outside joints are tight.

While the assembly is drying, cut and fit the drawer section bottom and the server bottom, then glue them into place. The drawer section bottom is clamped between the front and back aprons, while the cart bottom is clamped down onto the kick pieces *(photo 14)*.

While the clamped-up assembly is drying (assuming you had enough clamps to do it in one step), drill the bottle rests for dowels. For the front support, place one dowel at the top and bottom. The cutout on the back supports requires the two dowels to be located lower. Place the upper dowel as high as possible, but not so high that you drill through to the cutout *(photo 15)*.

Test fit the partitions in the cabinet to get the height correct. They should slide in with slight resistance. Next locate the dowel positions on the partitions ½" in from the back and front edges *(photo 15)*, dividing the space as shown in ***diagram 1***. Once drilled, glue and clamp the bottle rest assembly, and let dry *(photo 16)*. Also at this time, the drawer partitions and partition cleats should be glued and nailed/screwed as shown in *diagram 5*, then set aside to dry.

With that done, you can make the drawer. Its construction is simple since it won't be holding a great deal of weight. First cut out the sides, ends and bottom as shown in the Schedule of Materials. Then cut a ⅝"-deep x ¼"-wide rabbet on the bottom of all pieces to accept the drawer bottom. Sand the inside (rabbeted side) of the drawer parts, then glue and nail or pin them together *(photo 17)*. Cut the drawer bottom to fit into the rabbets, then nail or pin into place.

With the drawer assembled, place it in the opening with the front edge flush to the front apron. The drawer will be smaller in width than the opening, so use care to center it. Then place the drawer partitions along both sides of the drawer. Using a small piece of 1/16"-thick material, like laminate, as a spacer, move the partitions away from the drawer sides, providing

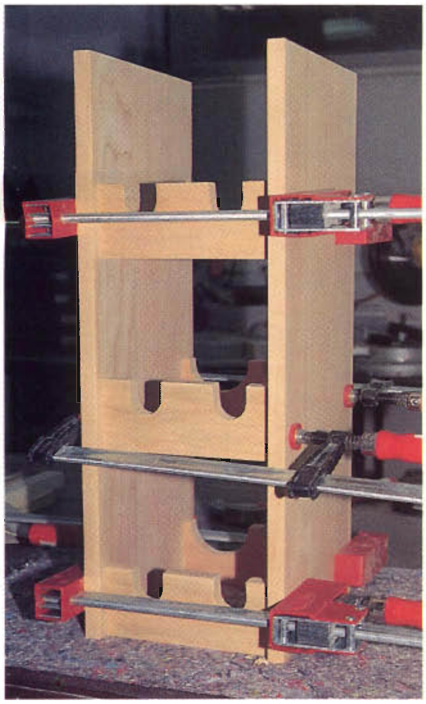


***Photo 16** The bottle section is assembled after the height of the partitions has been checked for fit in the server frame.*

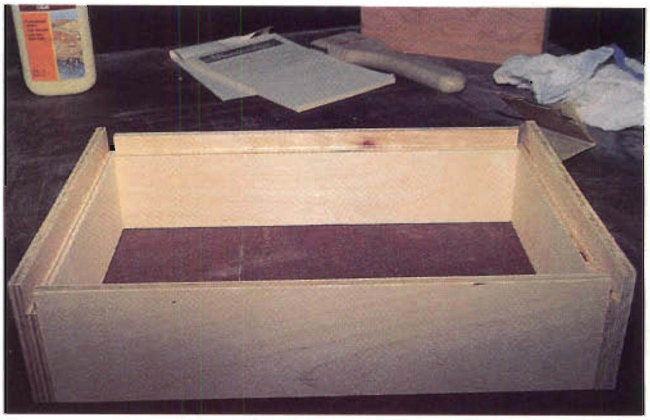


***Photo 17** The drawer box uses simple butt joints and a rabbet for the bottom.*

room for movement. Then fasten the partitions to the drawer section bottom with screws.

Now drill two 3/16" holes in the front of the drawer box, then slide the box into the opening and place the drawer front in the opening. The front should be stopped from falling too far into the opening by the partitions. Shim the drawer front up to allow even spacing on all sides and screw the front to the drawer box *(photo 18)*.

Unclamp the bottle section and sand the sides. Check carefully for squeeze-out, which should be removed using a sharp chisel and fine sandpaper.

Now slide the assembly into place on the server frame. Center the bottle section from left to right with the front set back ⅛" from the front apron. Remove the drawer and predrill, then screw the bottle section to the drawer section bottom. Next turn the entire piece over, check your left-to-right and front-to-back spacing again, and screw through the cart bottom into the bottle section.

✔ TIP Climb cutting with a router prevents tear-out. It's not recommended for inexperienced router users. The method involves routing in the opposite direction than usually practiced. To safely climb cut, grasp the router firmly and make repeated passes "shaving" the edge until the whole profile is complete. Practice using a small profile cutter first.

While the cart is still upside down, attach your casters. A stem caster from Faultless (available at most larger hardware stores) was used on our cart. First we drilled a hole to accept a "T" sleeve, then slid the caster into place.

The next step is the top. Note that the edging is 1"-thick, while the top piece is ¾". This extra ¼" is placed above the tray's surface, creating a lip to hold the tray in place on the server.

Cut or mill the edging to the sizes in the Schedule of Materials. While the profile pictured can be created using a table saw and a straight router bit, you may prefer to use a profile of your own creation. Once the profile is machined, sand to a smooth surface. Now cut miters on the ends, then glue and clamp them to the top *(photo 19)*.

The only construction left is the tray. This is the project's most visible element, so make sure you're not in too big of a hurry to finish. It's a simple mitered box construction with a dado cut ¼" up on the sides to accept the bottom. The bottom is made from solid cherry, planed to ¼" thick.

Once you've cut all the parts to size (leave some extra length for fitting), run your ¼" x ¼" grooves using the tray bottom to check for a comfortable fit. If it has to be forced, it's too tight. It should just slip in place.

Diagram 5

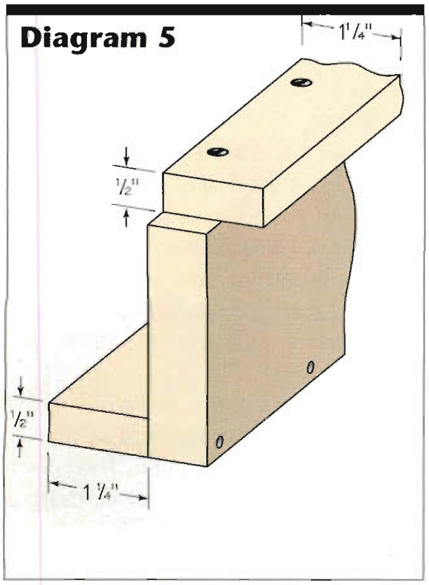
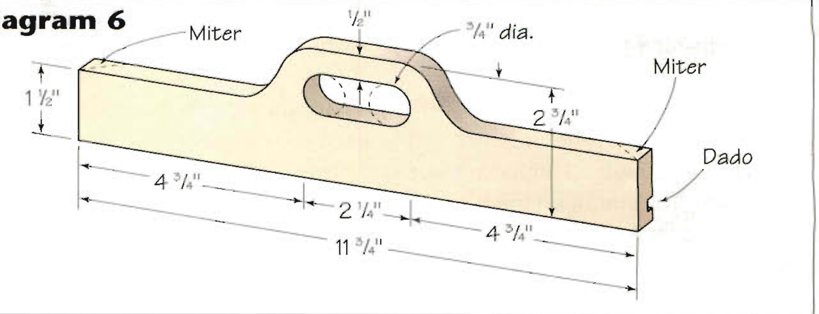


Diagram 6



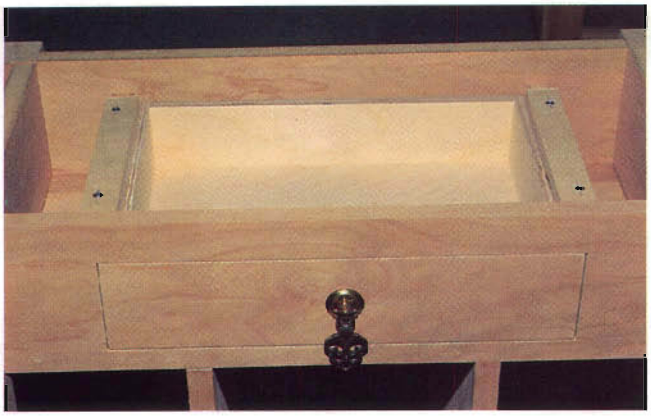


Photo 18 *The drawer is held in place left to right by the drawer partitions.*

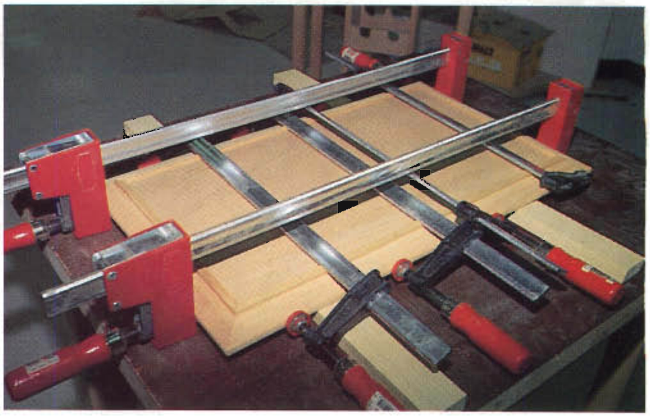


Photo 19 *The top's edges are glued in one step to make sure the corner miters are accurate.*

Next lay out the handles as shown in ***diagram 6***. Use a ¾" drill bit to make the holes first, then connect them using a scroll saw ***(photo 20)***. Now cut out the handle's outside shape using the table saw for the straight section and finishing the shape with a scroll saw.

Lastly, cut the sides to final length on a chop saw set to 45 degrees to miter the corners. Dry fit the pieces and check for two things: the bottom must fit with a little play across the grain width to allow for movement, and the tray should fit comfortably within the raised lip on the top.

Now assemble the tray, applying glue only at the mitered corners. Don't glue the bottom into place ***(photo 21)***. With assembly complete, sand all the surfaces to 220 grit. To achieve a rich, aged cherry appearance we used an oil-based red-mahogany stain. Apply the stain with a rag, and after a couple of minutes wipe off the excess with a dry rag. To stain tight corners, squeeze stain off the rag into the corners. This works well as long as all the excess stain is wiped off with a dry rag (or you risk a blotchy finish).

After drying for a day, spray a clear lacquer finish on the cart. If you're not experienced with spraying, this isn't the project for learning. Because of the interior spaces, it's very easy to develop runs and sags. You may prefer a brushed or rubbed-on finish.

After the finish has hardened, screw two ½" pan head screws into the top edge of either corner of the drawer back to serve as drawer stops. Then attach the top using glued dowels at the top of each leg.

The final step is installing the hardware. We chose a reproduction pull readily available from most full-service hardware stores and catalog sales companies. The wire stemware racks are a little more specialized, but also easy to find (See Sources List).

I guess all that's left to do is to stock the bar and call some friends.

Cheers! PW

David Thiel is associate editor of Popular Woodworking.

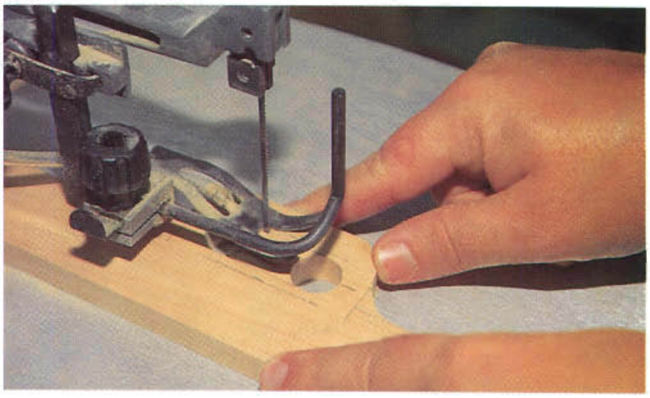


Photo 20 *A scroll saw is the perfect tool for connecting the two ¾" holes which form the tray handles.*

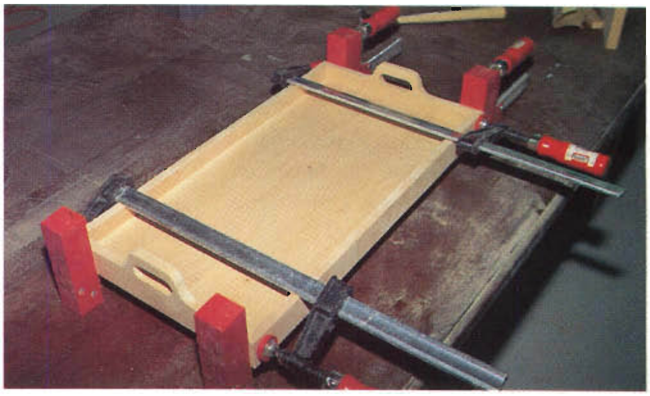


Photo 21 *The tray is glued and clamped only on the miters to allow the bottom to float in the groove.*

SOURCES LIST

For the 10" stemware rack, contact:
Johnson-Rose Corporation
P.O. Box 447
Lockport, NY 14095-0447
(716) 434-2711

For the drawer pull, contact:
The Woodworkers' Store
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Rogers, MN 55374-9514
(800) 279-4441

Keeping Cutting Edges Sharp

A short course on getting the cutting edge.

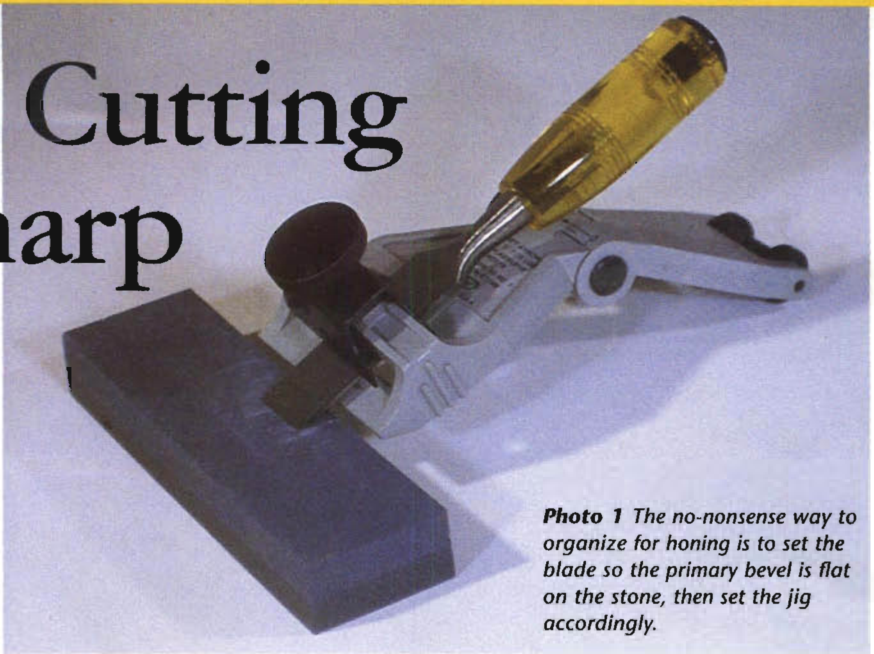


***Photo 1** The no-nonsense way to organize for honing is to set the blade so the primary bevel is flat on the stone, then set the jig accordingly.*

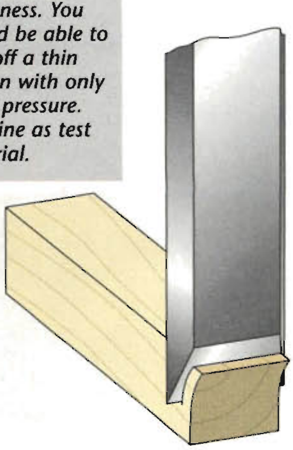
Cutting edges on shop tools such as chisels and plane blades must be established and maintained in flawless condition to ensure quality work. These tools rely on sharpness for better control, and a dull cutting edge is actually a shop hazard you can do without. Forcing a dull tool can cause it to slip or jump, possibly resulting in an unwanted "notch" in you or the work. Sharpening is an essential phase of good woodworking and, contrary to some opinions, not beyond our skills. We can easily have "the cutting edge." Working with less just doesn't make sense.

So What is "Sharp"?

The antonym of "sharp" is "dull," a state quickly exposed when muscle rather than technique is required to use a hand plane or wood chisel. You can see a dull edge, especially if you view it through a magnifying glass. A slim line of light will reflect from the surface where a fine edge has worn away. You can test for sharpness in traditional ways — using the tool to shave the hair from the back of your wrist or poking it at an angle against your thumbnail to see if it grabs; but the true test is ongoing — how the edge performs in use.

DIAGRAM 1

Test chisel for sharpness. You should be able to slice off a thin section with only hand pressure. Use pine as test material.



A better check (and one that doesn't endanger your epidermis) is to see if the tool will slice cross-grain through the end of a piece of ¾" pine with hand pressure only *(diagram 1)*. If it does, and especially if it leaves a smooth, shiny surface (no crushed fibers), the tool is as ready as it can be for efficient work.

One thing is certain, it's impossible to have a "nothing" edge. So, when sharpening, get as close to a micro-edge as possible while still providing bulk to back up the edge so it will function as long as possible. Primarily, this bulk is provided by the bevel at the cutting edge of the tool — 20 degrees is recommended for softwood, 30 degrees for hardwood.

Two Steps in Sharpening

The two steps in sharpening, grinding and honing, are completely different from each other. Grinding should be seen as a renewal program that's done infrequently and only when the tool's business end has been severely abused or nicked so it must be reconditioned; that is, reshaped. Honing, the true sharpening stage, should be done frequently *as you work*. Honing is the chore that keeps the cutting edge keen.

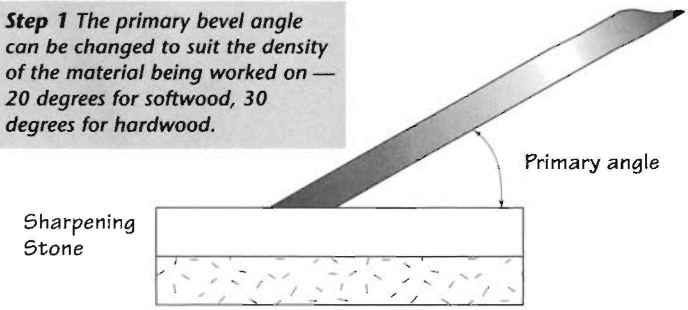
Both jobs can be done freehand, but store-bought and shop-made accessories will help you get the best results more easily.

Tips on Honing

Honing is done on stones, synthetic or natural, with designations like oil stone, whet stone, sharpening stone, and more. Many types, materials, shapes and sizes are available, too much to detail here. But I can recommend — at least as

DIAGRAM 2

***Step 1** The primary bevel angle can be changed to suit the density of the material being worked on — 20 degrees for softwood, 30 degrees for hardwood.*



a jumping-off point and simply because one has provided good service in my shop for years — an Arkansas combination stone, fine on one surface and coarse on the other.

A friend wisely advised me that when you buy any stone, be sure to check it for flatness. He once purchased a stone that was concave across its length, beyond saving. This often isn't an easy thing to check because of today's shrink packaging, but keep it in mind. Hint — some tool supply stores will have unwrapped stones in locked, glass-front cases, an indication of quality.

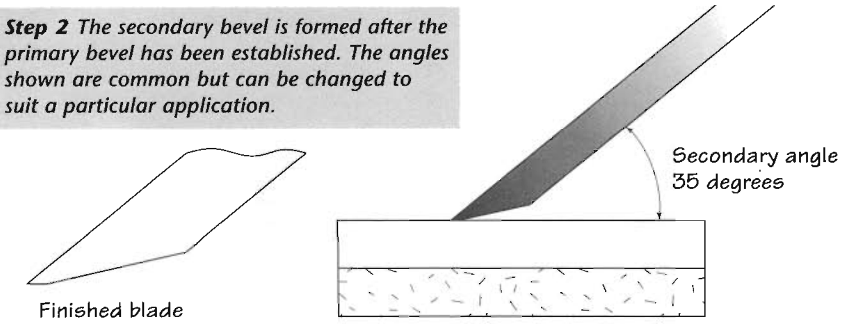
Most stones are designated as "oil stones" because they're used with oil during the honing procedure. Some sharpeners will saturate the stone before use and add oil as needed. The purpose of the lubricant is to suspend metal particles ("float" them) so the stone won't become clogged or glazed and will be easier to clean. Special oils are available, but common mineral oil, even thin "household oil" (we used to call it "sewing machine oil") will do as well and cost less.

I should mention before a critic does that an anti-oil school claims the blade being sharpened runs into the slurry of hone and steel suspended in the oil, establishing a situation that doesn't contribute to keen edges. This is debatable, but have some fun and evaluate it on your own by honing one blade dry and another with oil.

Honing Steps

A chisel or plane blade functions better if its back surface is flat and smooth. So, to start, place the blade flat on the stone and move it in small, circular strokes.

***Step 2** The secondary bevel is formed after the primary bevel has been established. The angles shown are common but can be changed to suit a particular application.*



You might want to duplicate *my* method for this step by making what I call a "lapping table" simply by attaching emery paper to a piece of *flat* hardwood or plate glass. The idea is to provide more abrasive surface than is available on a narrow stone.

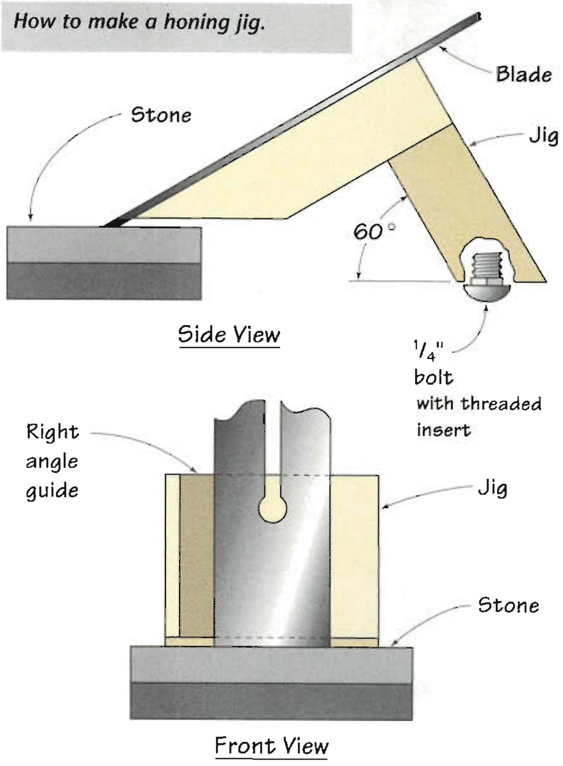
The next step is to place the blade so its bevel is flat on the stone *(step 1 in diagram 2)* and to move it in a circular or figure-eight fashion. Use one hand to apply light pressure so the bevel will remain flat on the stone.

You'll find that while this step hones the bevel, it also causes a wire edge. That is, metal at the cutting edge will be reduced to the point where it will flex away from the stone's surface. Get rid of the wire by inverting the blade, placing it flat on the stone, and making a few light, circular strokes.

The final chore duplicates the preceding step, but with the angle between the blade and stone increased a few degrees *(step 2 in diagram 2)*. This not only creates a secondary bevel, resulting in as keen an edge as you can get, but also provides some bulk so the cutting edge you've formed will hold up longer.

DIAGRAM 3

How to make a honing jig.



Mechanical Advantage

Like jigs for power tools, there are store-bought and shop-made accessories that eliminate the possibility of human error when doing honing chores. Being able to concentrate on moving the blade without worrying about the blade-to-stone angle is, in this case, a definite plus factor.

All commercial units — called "honing guides" or "sharpening guides" — have a clamping arrangement so the blade can be secured at the correct angle. The jigs are adjustable to suit various bevel angles, and they can be reset for the secondary bevel without having to remove the blade.

Some units ride directly on the stone. Others, like the example used in *photo 1*, have an outboard support. The advantage of the latter concept is that it enables you to use the stone's entire area, but you must be sure that your working surface is flat. Any irregularities in the surface that the support wheels ride on will cause the blade-to-stone relationship to change.

You can also make an outboard-support-type of honing jig like the one detailed in *diagram 3*. Adjustment for a

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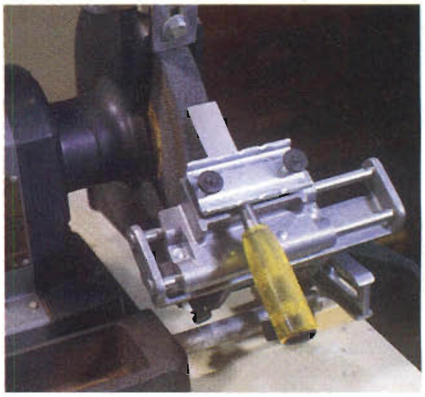


***Photo 2** The grinding attachment can be adjusted to tilt the blade to almost any angle to the grinding wheel.*

secondary bevel is provided by the bolt. If you can't tilt the blade enough by using just the bolt, you can rest the outboard support on a strip of wood.

Incidentally, after you've sharpened a plane blade, be sure to mate it correctly with the cap iron *(diagram 4)*. The cap iron's edge must be square across and fit tightly to prevent wood shavings from wedging under it and choking the blade. For general work, keep the cap iron's edge about $\frac{1}{16}$" back from the blade's edge. The setback can be less for cross-grain planing and when shaving wood with a curly grain.

Grinding

While honing is a finesse chore, done frequently as you work to maintain a keen edge, grinding is needed only if the blade has lost its shape, been nicked, or somehow abused so it is necessary to reform the cutting edge *(diagram 5)*. The work, done on a bench grinder, can be accomplished freehand; but, as with honing, being able to mechanically establish and maintain a precise angle between the blade and abrasive removes human error from the procedure. This is the boon offered by grinder attachments like the Craftsman unit being used in *photo 2*.

Initially, the angle between the blade and wheel is established by the bevel already on the blade. Thereafter, minor or even major changes can be made that will affect the length of the bevel or the degree of hollow grinding. In effect, you're grinding "in the round" and the relationship between the blade and wheel determines what occurs on the blade.

DIAGRAM 4

The cap iron of a hand plane must be square to the side of the blade — and it must fit tightly against the blade.

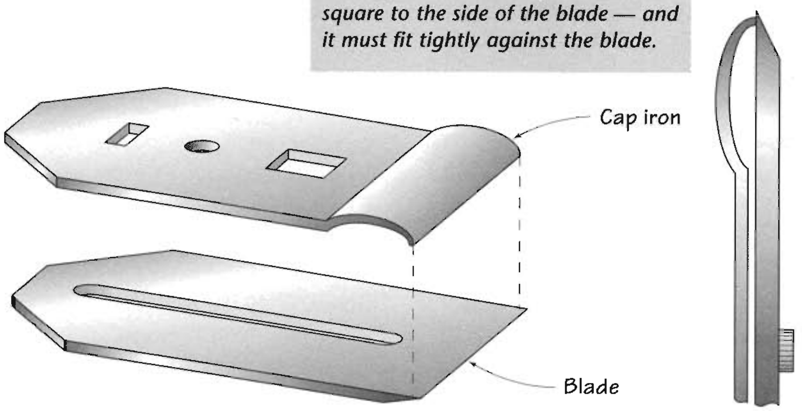
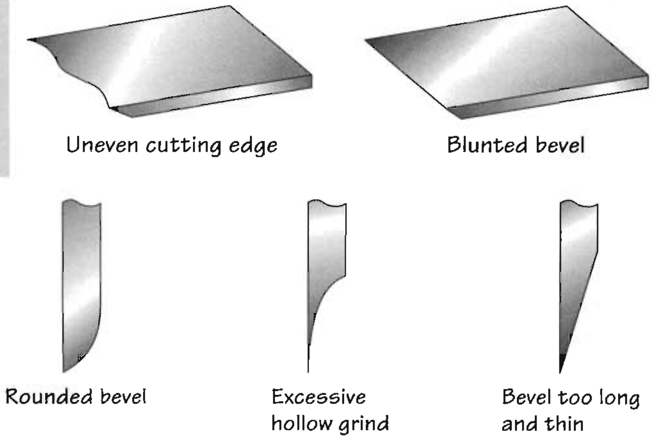


DIAGRAM 5

Grinding is needed only when the business end of the tool must be renewed.



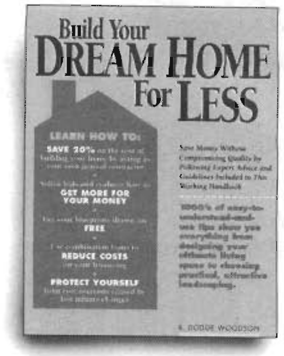
Take It Easy

Never, if you respect the cutting tool, muscle it up to the wheel so it blossoms like a sparkler on the Fourth of July. Cutting tools are tempered so the steel will be hard enough to hold an edge. A running, dry wheel can create more than enough heat to ruin the temper of the steel, rendering the tool useless. Good practice calls for light cuts and slow motion action across the face of the wheel. Grinding wheels, even fine ones, cut pretty fast, so it doesn't take a lot of time to do the job right by making slight, repeat cuts rather than a single heavy one. It's another woodworking situation where taking a little extra time pays possible dividends. Also, keep a container of water and a small brush nearby so you can frequently cool the tool. PW

***R.J. DeCristoforo**, a contributing editor for* Popular Woodworking, *has written more than 30 how-to books, including* Jigs, Fixtures and Shop Accessories.

WARNING

When grinding freehand or with an attachment, you might be tempted to use the side of the wheel — don't!
Common wheels aren't constructed for side grinding.
If at any time you must do side grinding, be sure to work with a wheel that's made for that application.
And don't forget your safety goggles!



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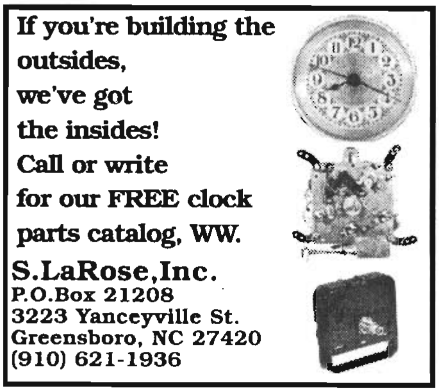
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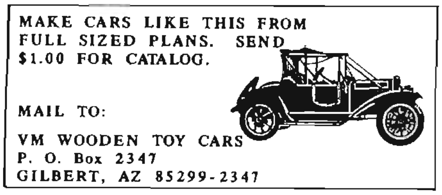
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COMING NEXT ISSUE

You'll find seven projects perfect for a summer shop schedule. Build a simple model sailboat before you head to the lake. Plus Editor Steve Shanesy's "The Little Shop That Could" series continues. With limited space and materials, he'll show you how to build a charming clock shelf in a weekend, really! We'll also provide plans for a decorative mirror and shelf, a country flip-top chair/table, an antique countertop recipe holder, and a Shaker-style bench. Speaking of Shakers, we'll also visit the only remaining Shaker woodworkers to see how they produce their coveted nesting oval boxes.

Also get your complete guide to "Essential Hand Tools," powered and non-powered. We'll even include a special list of tools to get your child or grandchild started in woodworking, complete with a toolbox to store them in! Plus R.J. DeCristoforo's "Tool Talk" will show you how to keep your hand saws in top condition all the time. See you again in August!

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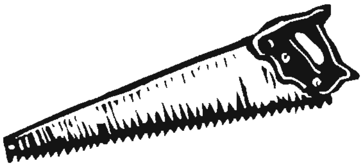

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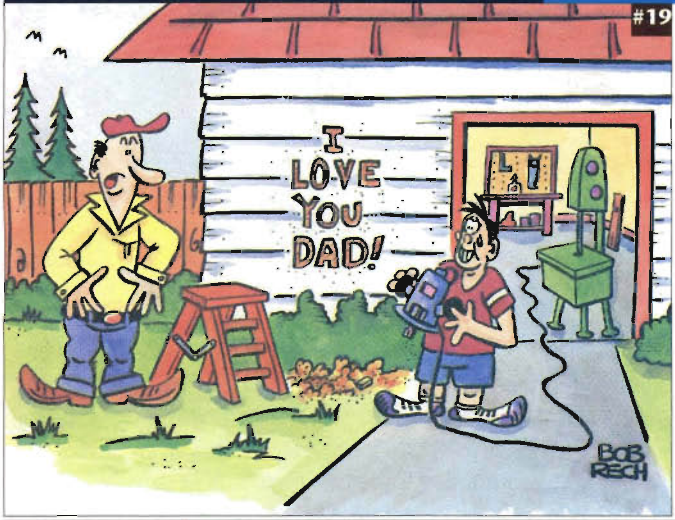

illustrated by Bob Rech

Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking*, Cartoon Caption #19, 1507 Dana Ave., Cincinnati, OH 45207 by June 10, 1996. Winning entries will be chosen by the editorial staff.

The winner receives a Bosch 2 hp Electronic Variable Speed Plunge Router, Model B1450. Features include: microfine depth adjustability in all plunge positions, quick-change template guide system eliminates need for screwdriver, shaft lock for one wrench operation, self-releasing collet for sure bit gripping and ease of bit change, variable speed control with soft starts and constant rpm. The 11 amp motor operates at 12,000 to 22,000 rpm.

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The winner of our "Caption the Cartoon Contest #17"

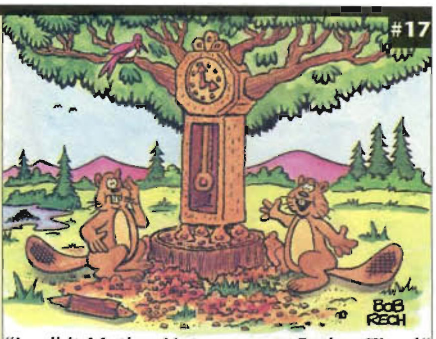
from the March issue and recipient of the Bosch Electronic Variable Speed Plunge Router is:

William White, from Jackson, Michigan.

The runners-up receive a one-year subscription to *Popular Woodworking*:

Gordon Knecht, from Cincinnati, Ohio, for:
"Just think what I could do with some power tools!"

R.J. Meek, from Salinas, California, for:
"Well, you're the one who brought home that copy of Popular Woodworking*."*



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MRPW7

Decision or Destiny?

To buy or not to buy a tool looms in every woodworker's mind, the final outcome may be a question of fate. . .

By Bryan Mills

A while back I heard that a local custom woodworker had died. It occurred to me that some tools might be available through the estate. Out of respect, I delayed making an inquiry for several months, and then was invited to look over the shop.

"Not much left," said the elderly sister who was showing me around.

She was right. The abandoned shop, now quiet, was filled with winter chill. Some sun came through the unwashed windows and fell on the gray, concrete floor. In the corner stood the furnace, a mass of sheet metal surrounded a heavy steel stove and grate. Without fire it appeared tired and spent. Behind me was a workbench bearing a few scattered hand tools, and by its side a substantial table saw.

"You're right," I said. "Not much left. I was hoping for a jigsaw or a band saw and perhaps a small lathe."

"What about the table saw?"

I paused, half-examined it, then finally said, "I have a table saw." I turned away.

"Two hundred dollars," she said.

"Two hundred dollars?" I examined the saw more closely. It was much bigger than mine. It had a wide, cast iron top set on a pedestal which enclosed a big motor to turn a 10" blade.

"I don't really need that," I thought to myself while walking slowly around the machine.

"What's the black stain there on the front?" I asked.

"That was singed by the fire in the shop about five years ago. Started from the furnace. He never recovered completely from the fire."

"Two hundred dollars?"

"Yeah. That's the price the appraiser put on it. I don't know nothing 'bout this stuff," she said.

I was not much better informed, having been in the business only a little more than three months. I had lost my college teaching job and was venturing on my own into woodworking.

"Would you hold this saw for me until tomorrow? I've got to think about it."

Thus was set in my mind what I call risk conflict. Should I or shouldn't I?

Isn't it strange how a simple idea can barge into the mind, take total command, push out all other thoughts, reach to the gut, tighten it, and turn it unceasingly? Should I or shouldn't I?

> **"Would you hold this saw for me until tomorrow? I've got to think about it."**

At home I went to my basement shop and looked at the table saw inherited from my father. Was it adequate? It was very small. . .Where would I put the big table saw? What would I do with the little one? Can I justify spending that money? We have unpaid bills! College tuition for two kids is coming due! Should I or shouldn't I?

Sleep came reluctantly that night. I woke up once and was confronted immediately by the saw's image.

"Graceful," I thought. "More power. . . That scorched stain could be painted over — blue. The table could be steel wooled and waxed."

Upon awakening, my first image was of the money — two hundred dollars! The vision gripped my empty stomach and shoved it toward the financial abyss.

I got up, washed, dressed, had breakfast and went to the shop. I could "see" the new saw sitting there by the post. I could "feel" a cherry plank effortlessly passing through the 10" blade. I could "see" the wide table supporting a sheet of plywood for ripping — a clumsy operation on the small saw and dangerous, too. I went upstairs. My wife had not yet left for work.

"I think I'll get that table saw," I said.

"If you need it, get it."

My son and I drove the pick-up through the snow covered hills, and loaded the saw, a filing cabinet and a bar clamp. I wrote a check.

At home we dismantled the saw and wrestled it to the basement shop. I set it up, waxed the table and painted the base — blue.

When it was dry, I put a cherry plank through with ease. The motor purred — a steady tool built for heavy work.

Later, in a drawer of the filing cabinet, I found the saw's singed owner's manual. It was a Delta 10" table saw built in the early 1940s. Unknowingly, I had purchased one of the finest table saws ever made. And at 32 years old, it performed perfectly, and to this date, more than 20 years later, it still does.

Fear and doubt passed quickly. I began savoring the new machine. What good fortune it has been to have acquired that table saw. I think of it as a gift. Granted, my hard earned cash went toward it, but in reality I had acted without full knowledge of the treasure I had purchased. So I see it as a gift: a gift from the engineers who designed it more than half a century ago, a gift from the craftsman who cared for it more than 32 years, a gift from the elderly sister who just happened to call it to my attention.

And I took a lesson from the experience: No matter how carefully we plan and how thoroughly we shop, sometimes it is nothing more than a circumstance or fate that mysteriously delivers the good we need — sometimes out of the arms of a fiery furnace.

***Bryan Mills** is a writer/craftsman from Williamsport, Pennsylvania, who specializes in building fine, period tall case clocks.*

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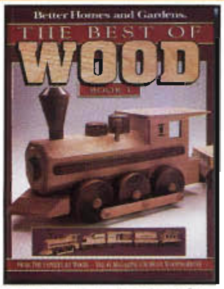

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WOOD® Magazine test, Sept. '93, pg. 45

The Proof Is In the Cutting

Both Woodworker II blades performed very well, whether cutting through butter-soft ¾"-thick pine or iron-hard 1¾"-thick ash. The 20° positive hook angle and 15° alternate top bevels give the blades an aggressive attack; we maintained a brisk, uniform feed rate while ripping a variety of woods on the powerful Unisaw and experienced no discernible resistance or slowing. On the smaller saws, switching to the thin-kerf blade allowed very similiar feed rates, again with barely noticeable resistance.

Although we've used blades that cut faster, their cut quality couldn't touch what we got with the Forrest blades. On solid stock, ripped edges came off our saws jointer-finished, smooth and slick with no visible teeth marks—good enough to edge-glue without additional machining. Crosscuts came out crisp and clean with no fuzzing or tiny splintering.

The Bottom Line

Performance of the Woodworker II is impressive enough that you could bolt this versatile, general-purpose blade on your saw and use it for virtually all of your cutting operations.

SHOP TEST, Woodworker's Journal Nov./Dec. '95 pg.78

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NEW SIZES AVAILABLE	LIST	SALE
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Sears 8-1/4" & Delta 8-1/4"x60Tx5/8"	$170	$ 99
Hitachi 8-1/2"x60Tx5/8"	$179	$109
DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	$179	$109
Delta 9"x80Tx5/8"	$204	$119
Ryobi-Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	$229	$139
Ryobi–Makita 14"x100Tx1"	$266	$179
Hitachi 15"x100Tx1"	$277	$189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

WOODWORKER I – CROSSCUT For TABLE and RADIAL SAW

	LIST	SALE
12"x60Tx1" or 5/8" 1/8"K	$198	$139
10"x60Tx5/8" 3/32"K	$162	$129
8"x60Tx5/8" 3/32"K	$150	$109

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8"x80Tx1/8" & 3/32" K	$202	$169
9"x80Tx1/8" & 3/32" K	$207	$179
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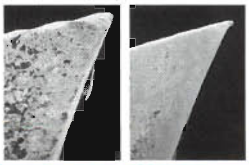

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